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Ontario

Madawaska River

WATER MANAGEMENT REVIEW

Final Report

January 2000

ONTARIO POWER GENERATION

100-05125/

Ontario

Madawaska River Water Management Review

Ministry of Natural Resources
and
Ontario Power Generation

March 2000

ONTARIO POWER GENERATION

Table of Contents

Approval Statement i

Acknowledgments iii

Executive Summary v

1.0 History of the Madawaska River 1

2.0 Problems, Issues and Solutions 3

2.1 Background 3
2.2 Goal and Objectives 3
2.2.1 Hydroelectric Generation 7
2.2.2 Flood Control 8
2.2.3 Recreation/Tourism 9
2.2.4 Fish and Aquatic Ecosystems 12
2.2.4.1 Developmental Effects 12
2.2.4.2 Operational Effects 14
2.3 Generic Issues 15
2.4 Ottawa River to Arnprior Generation Station (GS) Reach 31
2.5 Arnprior GS to Stewartville GS Reach 34
2.6 Stewartville GS to Calabogie GS Reach 37
2.7 Calabogie GS to Barrett Chute GS Reach 42
2.8 Barrett Chute GS to Mountain Chute GS Reach 47
2.9 Mountain Chute GS to Griffith Reach 49
2.10 Griffith to Palmer Rapids Dam Reach 54
2.11 Palmer Rapids Dam to Bark Lake Dam Reach 59
2.12 Bark Lake Dam to Headwaters Reach 65

3.0 Information Needs 73

3.1 Information Needs – Aquatic 73
3.2 Information Needs – Other 82

4.0 Water Management Plan 85

4.1 Operating Criteria – Ontario Power Generation 85
4.2 Operating Criteria – Ministry of Natural Resources 103

5.0 Implementation **112**

5.1 Standing Advisory Committee for Madawaska River Water Management Review 112

6.0 Appendices **115**

Appendix 6.1: Terms of Reference for Madawaska River Water Management Review 115

Appendix 6.2: Terms of Reference for Public Advisory Committee 116

Appendix 6.3: Planning Schedule 120

Appendix 6.4: Problems and Issues Outside the Terms of Reference 121

Appendix 6.5: Erosion Working Group Terms of Reference 124

Appendix 6.6: "Walleye Watch" Requirements 126

Appendix 6.7: Community Fisheries and Wildlife Involvement Program Information 128

Appendix 6.8: Renfrew County Stewardship Council membership list 131

Appendix 6.9: Fish Habitat Policy objectives 133

Appendix 6.10: Full text of the Fisheries Act, Sections 20, 21, 22, 27, 30, 32, 35, 36 135

Appendix 6.11: Environmental Bill of Rights Environmental Registry Posting 139

Appendix 6.12: Visitor Survey of the Madawaska River, July/August 1997 142

Appendix 6.13: Bibliography 154

7.0 Glossary of Terms **160**

8.0 List of Acronyms **165**

List of Figures

1.	Logging in the 1800's – Ottawa Valley	Pg. 2
2.	Madawaska Watershed Map 1	Pg. 4
3.	Madawaska Watershed Map 2	Pg. 5
4.	Generating Stations and Storage Dams on the Madawaska River	Pg. 6
5.	Tourism – Madawaska River	Pg. 10
6.	Fishing and Kayaking – Madawaska River	Pg. 11
7.	Madawaska River Fish Species	Pg. 13
8.	Shoreline Erosion and Remediation, Lake Madawaska	Pg. 18
9.	Reaches 1 – 5	Pg. 32
10.	Arnprior Weir	Pg. 33
11.	Arnprior G.S. and Forebay	Pg. 36
12.	Stewartville G.S. and Upstream	Pg. 39
13.	Calabogie and Upstream	Pg. 44
14.	Barrett Chute GS and Forebay	Pg. 48
15.	Reaches 6 – 8	Pg. 50
16.	Mountain Chute G.S. and Forebay	Pg. 51
17.	Madawaska River between Griffith and Palmer Rapids	Pg. 55
18.	Palmer Rapids Dams	Pg. 58
19.	Conroy Marsh and Kayaking	Pg. 63
20.	Bark Lake and Upstream	Pg. 66
21.	Reach 9 and Upstream	Pg. 67
22.	Information Needs – Loon / Walleye	Pg. 74
23.	Information Needs – Velocities / Habitat	Pg. 76
24.	Information Needs – Tagging / Sampling	Pg. 78
25.	Typical Operating Band – Bark Lake	Pg. 96
26.	Typical Operating Band – Kamaniskeg Lake	Pg. 97

27.	Typical Operating Band – Mountain Chute G.S.	Pg. 98
28.	Typical Operating Band – Barrett Chute G.S.	Pg. 99
29.	Typical Operating Band – Calabogie G.S.	Pg. 100
30.	Typical Operating Band – Stewartville G.S.	Pg. 101
31.	Typical Operating Band – Arnprior G.S.	Pg. 102
32.	MNR Structures – Aylen Lake / Galeairy Lake	Pg. 105
33.	MNR Structures – Opeongo Lake / Baptiste Lake	Pg. 106
34.	Aylen Lake – Operating Band	Pg. 107
35.	Galeairy Lake – Operating Band	Pg. 108
36.	Baptiste Lake – Operating Band	Pg. 109
37.	Opeongo Lake – Operating Band	Pg. 110

Approval Statement

The Madawaska River travels 225 kilometres from its source in Algonquin Provincial Park to where it joins the Ottawa River at the Town of Amprior. Once a "waterborne" highway for the logging industry during the nineteenth century, it now serves as a recreational haven for a variety of activities, including fishing, white-water rafting, kayaking, boating, swimming, trapping, cottaging and resort use. A valued source of hydroelectric power generation and home to a variety of fish and wildlife species, the Madawaska River drains a watershed of over 8,500 square kilometres.

The Ministry of Natural Resources has eleven dams with another five on some of the tributaries, for a total of sixteen. Originally constructed in support of the logging industry, their main function today includes providing recreational benefits and flood control. Ontario Power Generation (formerly Ontario Hydro) has seven dams on the river, five of which produce electricity.

For more than half of the twentieth century, Ontario Power Generation has managed flows along the Madawaska River to produce economical electric power. This has had significant impacts on spawning fish species, particularly walleye, throughout the system. In 1995, the Ministry of Natural Resources and Ontario Power Generation decided to undertake the production of a water management review of the entire river in order to identify the problems and issues along the Madawaska River and develop solutions for them.

This has been a major, precedent-setting undertaking, requiring an enormous amount of time and dedication on behalf of all parties involved, including both agencies, the Public Advisory Committee, and contributions from members of the public through the public consultation process. The water management review reflects the results of those efforts and provides the necessary future direction for data collection, water management and informed decision making. This is a dynamic process that will continue long after the plan has been completed. By working co-operatively and improving communications between the agencies and among our clients, the management of the Madawaska River can be used as a model for similar watersheds throughout the province. It is our pleasure to approve the Madawaska River Water Management Review.

Ray Bodenberg
District Manager
Ministry of Natural Resources
Pembroke District
Southcentral Region

Joan Eaton
Manager
Water Resources Division
Hydroelectric
Ontario Power Generation

Acknowledgements

The successful completion of the Madawaska River Water Management Review could not have happened without the support, dedication, participation and commitment of many people. It is important to acknowledge their contributions to a project that is unique to the Province of Ontario - two organizations, one a utility and the other the regulator, working together toward a common goal, the development of a water management review that would balance the interests of both parties, and address the needs of the local community.

This project would not have been possible without the support of senior officials in both Ontario Power Generation (OPG) and the Ministry of Natural Resources (MNR). Joan Eaton, Manager, Water Resources Division, OPG and Pembroke District Manager Ray Bonenberg, were instrumental in getting the project approved and "off the ground". There was additional support and involvement from both organizations through the establishment of a Steering Committee and local Working Group. The Steering Committee was originally made up of MNR staff Ray Bonenberg, Madawaska Area Supervisor Mike Bohm, Ian Crawford, Senior Policy Advisor, Water Management Section, Henry Wallace, Water Management Section and from OPG, Joan Eaton and Plant Group Manager, Ottawa/St. Lawrence Plant Group John Tammadge. The Ministry of the Environment representation on the Steering Committee included Victor Castro from Kingston. The Fisheries and Oceans Canada representative was Wayne Hyatt from Burlington. He was replaced by Fisheries Habitat Biologist Dan Thompson. The Steering Committee provided the provincial lead, removing any barriers to the process, keeping senior staff apprised of the progress of the project and approving the work being done by the Working Group and local Public Advisory Committee.

The Working Group consisted of representatives from both organizations. Originally Co-chaired by Mark Stabb, Madawaska Area Biologist, MNR, and Bob Vinski, Water Resources Engineer, OPG, District Planner Paul Kingfisher replaced Mark in 1997. After accepting a position in MNR's Peterborough office in 1998, Paul was subsequently replaced by Information Management Supervisor Ron Spurr, the current MNR Co-Chair. The other original members of the Working Group from MNR included Engineer Nick Paroschy, Regional Fisheries Biologist Henk Rietveld, and Senior Lands, Waters and Planning Technician Roger Levoy. Ron Spurr was added to the team to assist with the Communications Plan and public consultation process. Mountain River Area Biologist Tim Haxton was added to the team. Subsequently, he was replaced by Madawaska Area Biologist John Boos.

OPG representatives on the Working Group included Bob Vinski, Senior Environmental Advisor, Biologist Greg Pope and Group Leader, Operations and Plant Support, Ottawa River Plant Group, Jim Whyte and Public Affairs Officer, Linda Halliday.

In 1999, MNR added Henry Checko, Area Technician and Tom Smith, Administration Supervisor, from Algonquin Provincial Park and Brian Vermeersch, Area Supervisor from Bancroft. OPG added Water Resources Engineer Don Ferko.

In MNR, there was also tremendous main office support from David de Launay, Director, Lands and Natural Heritage Branch. More recently, continued support has come from Ron Running, Manager, Water Management and Conservation Authorities Section and Assistant Deputy Minister Bill Allen, Natural Resources Branch. They ensured the necessary fiscal support and commitment to the project.

In September 1997, a Public Advisory Committee (PAC) was chosen to review and give advice to the two organizations on the review. There were eleven original members on the PAC but two left the committee after the first year. The remaining PAC consisted of:

- Jack O'Dette, who has served over 30 years on a variety of conservation organizations, including the Ontario Federation of Anglers & Hunters and is the recipient of the Carling Conservation Award, the Roland Michener Conservation Award and Order of Canada.

- Claudia van Wijk, a ten-time Canadian champion and world bronze medalist in whitewater kayaking, owner and director of the world's first whitewater school for kayaks and canoes on the Madawaska River, a graduate of Carleton University, was commentator for CBC at the 1996 Olympics in Altanta, a participant in mountain biking, hiking, windsurfing and competes nationally in cross-country skiing.

- Steve Roy, in the Technical and management services field, a local resident living with his family on the Madawaska River, involved in a variety of community service, economic development and training initiatives in Renfrew County.

- Barry Martin, an Algonquin College graduate and active outdoorsman sportsman, a year-round resident with his family on Black Donald Lake, former deputy reeve and reeve of Brougham Township, past director of various local organizations.

- Eldon Pennock, with over 37 years of employment with Ontario Hydro, active in local politics, formerly deputy reeve of the Township of Bagot and Blythfield, currently as a municipal councilor

- Richard Weese, now retired, a long-time resident living in Palmer Rapids, a member of municipal council for the Township of Raglan.

- Bob Yach, representing the Township of Griffith and Matawatchan, formerly a member of the Madawaska Highlands Committee, former Chair of the Madawaska Highlands Citizens Committee, Chair of the Griffith and Matawatchan Ratepayers' Association, currently Chair of the Madawaska Highlands Advisory Committee.

- Susan Bernhardt, currently residing in Griffith, has many years of experience with various federal government agencies, has been actively involved with the Rideau River Conservation Authority, Friends of Jock River , and has interests in many aspects of the natural environment.

- Jim Allingham, a long-time resident of the Madawaska Valley, owner and operator of Pine Cliff Resort , located on the Madawaska River, and Sunny Hill Resort on Bark Lake.

Over the period of twenty-six months, the PAC met with the Working Group a total of twenty-four times. Almost all of the meetings were in the evening. Most of the meetings were from three to four hours in length. The PAC is a group of individuals committed to the success of the process. Each deserves an enormous amount of credit and a great deal of gratitude from MNR, OPG and the local residents for the many hours of their own time they spent on this project.

Executive Summary

In June 1995, as a result of concerns expressed both locally and to the Chairman of Ontario Hydro and the Minister of Natural Resources, agreement was reached between the Ministry of Natural Resources (MNR) and Ontario Hydro (now Ontario Power Generation, OPG), to form a partnership to conduct a review of water management of the Madawaska River. One of the basic premises of this partnership was to identify the problems and issues associated with levels and flows and to develop solutions to them.

The Madawaska River is located in southeastern Ontario and flows 225 kms from its headwaters in Algonquin Provincial Park to the Ottawa River at Arnprior. Its drainage area covers over 8500 square kilometres. The river supports a range of uses, from generating electricity and flood control, to a significant amount of recreational and tourism activities. MNR has operational responsibilities for several dams. OPG operates several major storage and hydroelectric facilities on the river. MNR administers the legislation that provides rights to flood Crown land and use water resources.

The goal of the water management review is to develop a water management plan for the Madawaska River and ensure public awareness of the plan. A by-product of communicating the plan results is establishing an improved communications process between the two organizations, local clients, stakeholders and the public.

The main focus is on the river itself, water levels and flows and how these affect the aquatic ecosystem and other uses. The review is to be carried out keeping ecosystem, watershed and resource use perspectives in mind while ensuring long term opportunities for broad public involvement in the river's management.

Public participation and consultation is an important ingredient in the review process. A Public Advisory Committee was selected in September 1997 to provide advice and direction to the inter-organization review team. Three phases of public consultation, including focus groups and open houses were undertaken to outline the process to the public, and to document issues and concerns in order to develop a water management plan.

From the public consultation, it was determined that there were major concerns about the fishery and other ecosystem components. An "information needs" document was developed to identify specific projects, in order to gather information that will allow the organizations to respond to the concerns raised. Some of the individual projects have been completed and operating criteria incorporated in the water management plan. The information needs document is a dynamic document, spanning several years, and will be continually updated as current projects are completed and new ones identified.

Some accomplishments completed during the planning process include:

- providing minimum flows to enhance walleye spawning at Bells Rapids and the Calabogie North Channel
- reduction of water level fluctuations at the Stewarville GS and Mountain Chute GS
- construction of additional spawning habitat in the Barrett Chute tailrace
- posting water level and flow information on a website specifically created for the Madawaska River
- completion of an economic profile of the Madawaska River
- preparation of the following reports;

Preliminary Survey of Madawaska River Wetlands Field Notes, July 1997 – March 1998
Fall Walleye Index Netting (FWIN), Centennial Lake, October 1998 – May/1999
Effects of Hydroelectric Operations on Walleye Spawning – May/1999

A water management plan that identifies operating criteria for MNR- and OPG-controlled structures has been produced. It is a work in progress that captures the current limitations. Changes will be incorporated as additional infor-

mation from the information needs work program becomes available. Originally, MNR operating data were not included in the water management plan. Some data are included but a review of operating practice is under way and will be incorporated in the future.

A process for continued public involvement in Madawaska River water management is being developed in conjunction with this review. A Standing Advisory Committee will be formed to monitor the implementation of the water management plan. OPG and MNR staff will continue to be involved with the information needs program and amendments to the water management plan. The Standing Advisory Committee will also be responsible for bring any new problems and issues to the two organization representatives.

The Ministry of Natural Resources and Ontario Power Generation share a commitment to sustainable development. In this plan, sustainable development is defined as a water management regime that results in a balance among a range of natural heritage, social and economic values and uses for the benefit of present and future generations. It is anticipated that this balance can be achieved through a commitment on the part of the organizations through maintaining the following goals:

1. **sustaining and enhancing the river's aquatic ecosystems and biological diversity**

2. **generating electricity safely, efficiently, reliably and economically (at competitive prices) while making a reasonable effort to ensure that the economic well-being of other stakeholders is considered**

3. **supporting a range of recreational and tourism uses**

4. **fostering greater public awareness and understanding of the river as an interconnected system**

5. **being cooperative and maintaining improved levels of communications**

6. **working in partnership with individuals and groups**

Résumé

En juin 1995, à la suite des inquiétudes exprimées localement et devant le président d'Ontario Hydro et le ministre des Richesses naturelles (MRN), une entente avait été conclue entre le ministère et Ontario Hydro (désormais Ontario Power Generation, ou OPG) en vue d'examiner conjointement la régularisation des eaux sur le cours de la rivière Madawaska. L'objet principal de cette association était de reconnaître les problèmes relatifs au niveau et au débit de la rivière pour les solutionner.

La rivière Madawaska est située dans le sud-est de l'Ontario. Elle prend sa source dans le parc provincial Algonquin et s'écoule sur 225 km jusqu'à Arnprior où elle se jette dans la rivière des Outaouais. Son bassin s'étend sur une superficie de 8 500 kilomètres carrés. La rivière connaît plusieurs fonctions telles que production d'énergie hydroélectrique et régularisation des inondations, tout en offrant également des nombreuses possibilités de loisir et de tourisme. Le MRN est responsable des opérations de plusieurs barrages et l'OPG possèdent d'importantes installations d'entreposage et de production hydroélectrique le long de la rivière. Le MRN veille à l'application des textes de loi qui permettent d'inonder les terres de la Couronne et d'utiliser les ressources aquatiques.

L'examen de la régularisation des eaux a pour but d'élaborer un plan de gestion du cours de la rivière Madawaska et d'assurer que le public en est avisé. L'un des sous-produits attendus de la diffusion des résultats du plan est l'établissement d'un meilleur processus de communication entre les deux organisations et avec leurs clients locaux, divers intervenants et le grand public.
L'objet principal est la rivière elle-même, son niveau et son débit et leurs effets sur l'écosystème aquatique et les autres activités. L'examen doit se dérouler en tenant compte de chaque domaine, soit l'écosystème, le bassin hydrographique et les utilisateurs de la rivière, en vue de promouvoir la participation du grand public sur tous les aspects de la rivière et à long terme.

La consultation du public et sa participation forment une composante importante de cet examen. On a donc formé un comité consultatif public en septembre 1997, dont le rôle est d'aviser l'équipe interorganisations responsable de l'examen. La consultation publique se répartissait sur trois stades, comprenant chacun des groupes de discussion et des journées portes ouvertes, pour permettre au public de suivre le processus de près en documentant les problèmes et les questions dans le cadre de l'élaboration du plan de gestion des eaux.

La consultation publique a permis de déterminer que les pêches et d'autres composantes de l'écosystème suscitaient des inquiétudes marquées. On a alors ouvert un dossier de renseignements à obtenir, pour définir les projets précis qui produiraient les données permettant aux organisations d'offrir une réponse. Certains projets sont terminés et des critères d'activité ont été ajoutés au plan de gestion des eaux. Le dossier de renseignements est un organe dynamique qui s'étend sur plusieurs années et doit être mis à jour régulièrement à mesure que les projets courants se terminent et que d'autres sont lancés.

Parmi les réalisations à l'actif du processus de planification :

- assurer un débit minimum pour améliorer le frai des dorés aux rapides Bells et dans le chenal Calabogie nord;
- réduire la fluctuation des eaux aux stations génératrices de Stewarville et Mountain Chute;
- afficher les données concernant le niveau et le débit à un site Web consacré spécialement à la rivière Madawaska;
- achever le profil économique de la rivière Madawaska;
- rédiger les rapports suivants :
- aperçu préliminaire des notes d'opérations sur les terres humides de la rivière Madawaska – juillet 1997 à mars 1998
- décompte des prises commerciales de dorés pêchés au filet, lac Centennial – octobre 1998 à mai 1999
- effets des opérations hydroélectriques sur la reproduction du doré – mai 1999

(Une liste complète des projets achevés, prévus et en cours se trouve à la section du rapport Information Needs consacrée au dossier des renseignements.)

Nous avons maintenant un plan de gestion des eaux qui énonce les critères applicables aux opérations du MRN et de l'OPG. C'est un document en évolution continuelle qui saisit les limitations courantes. Il sera mis à jour à mesure que de nouvelles données du dossier de renseignements seront diffusées. À l'origine, les données des opérations du MRN ne faisaient pas partie du plan de gestion des eaux. Certaines données s'y retrouvent néanmoins, mais un examen des méthodes opérationnelles est en cours et doit être incorporé à l'avenir.

On met au point actuellement un processus visant à assurer la participation continue du public dans la gestion des eaux de la rivière Madawaska, parallèlement au présent examen. On formera un comité consultatif permanent responsable de suivre la mise en œuvre du plan de gestion des eaux. Le personnel de l'OPG et celui du MRN poursuivront leur participation au programme de renseignements et à la formulation de modifications au plan de gestion. Le comité consultatif permanent sera également responsable de signaler aux représentants des deux grandes organisations tout problème ou dossier à examiner.

Le ministère des Richesses naturelles et l'Ontario Power Generation partage le même engagement à assurer un aménagement durable. Dans le plan de gestion, par « aménagement durable » (sustainable development), on entend un régime de gestion des eaux qui produise un équilibre entre tout une gamme d'activités valorisant le patrimoine naturel, les exigences sociales et économiques et les diverses formes d'utilisation des générations actuelles et futures. On prévoit que cet équilibre se réalisera par la poursuite de l'engagement des organisations au respect des buts suivants :

1. assurer la durabilité et la mise en valeur des écosystèmes aquatiques et de la biodiversité de la rivière;
2. générer de l'électricité de manière sûre, efficace, fiable et économique (à un prix concurrentiel) tout en s'efforçant autant que possible d'assurer que le bien-être économique d'autres intervenants du bassin hydrographique n'en souffre pas;
3. appuyer la poursuite de nombreuses activités récréatives et touristiques;
4. sensibiliser le public à un plus haut degré et favoriser sa compréhension de la rivière en tant que réseau complexe;
5. faire preuve d'un esprit de coopération et maintenir de bonnes communications; et
6. collaborer avec les partenaires collectifs et individuels.

1.0 History of the Madawaska River

The headwaters of the Madawaska River consist of a network of streams and lakes located in and near the south-eastern portion of Algonquin Provincial Park. The river cuts its way across the Precambrian Highlands of the Canadian Shield in its 225-kilometer journey to its confluence with the Ottawa River at Lac des Chats near Arnprior. Over its length, the river drops 244 meters, most of the drop occurring between Bark Lake and Arnprior. The total drainage area is over 8500 square kilometers.

The name "Madawaska" was derived from the Algonquin name "Madoueskak", meaning "Land of the Porcupine". The river was used by the local aboriginal people for travel and the transportation of goods. It played a strategic role relative to their home territories and commerce.

Following early European exploration in the seventeenth century, settlements began to spring up throughout this part of the Ottawa Valley. The logging companies during the first half of the nineteenth century had worked along the tributaries of the Ottawa River. Lumbermen harvested white pine, red pine and oak along the Petawawa, the Bonnechere and the Madawaska, water routes that made access easy for logging companies and exits easy for timber they felled.

The Madawaska River witnessed some of the earliest commercial lumbering activities in Ontario, with the greatest activity occurring in the period from 1860 to 1890. As early as the 1840s, the government was providing assistance to lumber companies by building slides and booms to facilitate log drives on the river. By 1867, the logging companies had built dams on the upper main reservoirs including the Bark Lake and Palmer Rapids Dams. Dams were also constructed at Highland Chute, Mountain Chute, Calabogie and Arnprior to assist operations.

By the 1920s, lumbering had declined and the river use was gradually re-orienting toward hydroelectric generation. Private interests had built a number of dams on the tributaries of the river. Ontario Hydro first became involved on the river in 1929, with the purchase of the Calabogie Generating Station from the M.J. O'Brien interests, along with the two upper reservoir dams at Bark Lake and Palmer Rapids.

By 1940, the demand for energy was growing as a result of World War II. Bark Lake Dam was re-constructed raising the level by 8 metres and creating a significant storage reservoir. The lake was operated to provide flood storage and moderate flows in the river. Barrett Chute Generating Station was constructed and became operational in 1942. Building of Stewartville Generating Station began in 1946 and it was opened in 1948.

Energy demand in Ontario continued to grow during the 1960's requiring additional resources. Mountain Chute Generating Station was built in 1965-66. Barrett Chute GS and Stewartville GS were re-developed by adding generators. The capacity of the stations was increased by a factor of 4. Arnprior Generating Station was the last dam constructed and began operating in 1976.

Ministry of Natural Resources dams on the Madawaska and Opeongo Rivers were originally built to accommodate log drives during the nineteenth century. Log drives were phased out. Physical improvements and developments occurred around the lakes during the time of the log drives. These structures remain today. They include the Opeongo Lake Dam, Booth Lake Dam, Victoria Lake Dam, Cache Lake Dam, Sasajewun Lake Dam, Lake of Two Rivers Dam, Rock Lake Dam, Galeairy Lake Dam, Hay Lake Dam, Weslemkoon Lake Dam and Baptiste Lake Dam.

The construction of dams changed the majority of the river into a series of reaches. Recreation and commercial use developed and continues to do so to the present. As a result, in 1995 it became apparent reviewing the complex task of river management should include a process of public consultation.

Figure 1
Logging in the 1800's - Ottawa Valley

2.0 PROBLEMS, ISSUES AND SOLUTIONS

2.1 Background

An extensive consultation process was undertaken to identify issues and concerns that affect the Madawaska River. This phase of the process has been completed with the help of focus group and open house meetings. The next task was to develop solutions, where possible, to the issues and concerns identified. The descriptions of the issues appear as they were presented through the public consultation process.

The terms of reference for the review, public advisory committee and initial planning schedule are found in Appendicies 6.1 - 6.3. The environmental registry posting material is in Appendix 6.11.

This document reflects the solutions which have been developed by the members of the Public Advisory Committee (PAC), Ministry of Natural Resources (MNR)/Ontario Power Generation (OPG) Working Group and Steering Committee. Additional issues and concerns can be added as they are identified through future public consultation processes.

Generic issues affect more than one reach of the river and appear at the beginning of the document. A detailed analysis follows, presented by river-reach. The identified reaches are;

1. Ottawa River to Amprior GS
2. Amprior GS to Stewartville GS (Lake Madawaska)
3. Stewartville GS to Calabogie GS
4. Calabogie GS to Barrett Chute GS (Calabogie Lake)
5. Barrett Chute GS to Mountain Chute GS (Norcan Lake)
6. Mountain Chute GS to Griffith (Centennial Lake, Black Donald)
7. Griffith to Palmer Rapids Dam
8. Palmer Rapids to Bark Lake (Negeek Lake, Conroy's Marsh, Kamaniskeg Lake)
9. Bark Lake to Algonquin Provincial Park headwaters

2.2 Goal and Objectives

A water management plan for the Madawaska River must address many public interests. Among these are ensuring public safety, maintenance of the aquatic ecosystem, and providing for hydroelectric generation and other uses.

The Terms of Reference for the water management review outline the goals and objectives of water management for the Madawaska River.

The goal is:

- *To develop an inter-organization (OPG, MNR) water management plan for the Madawaska River and to communicate it to the public.*

The objectives are to:

1. Review existing water management by OPG and MNR from an ecosystem, watershed and resource use perspective.

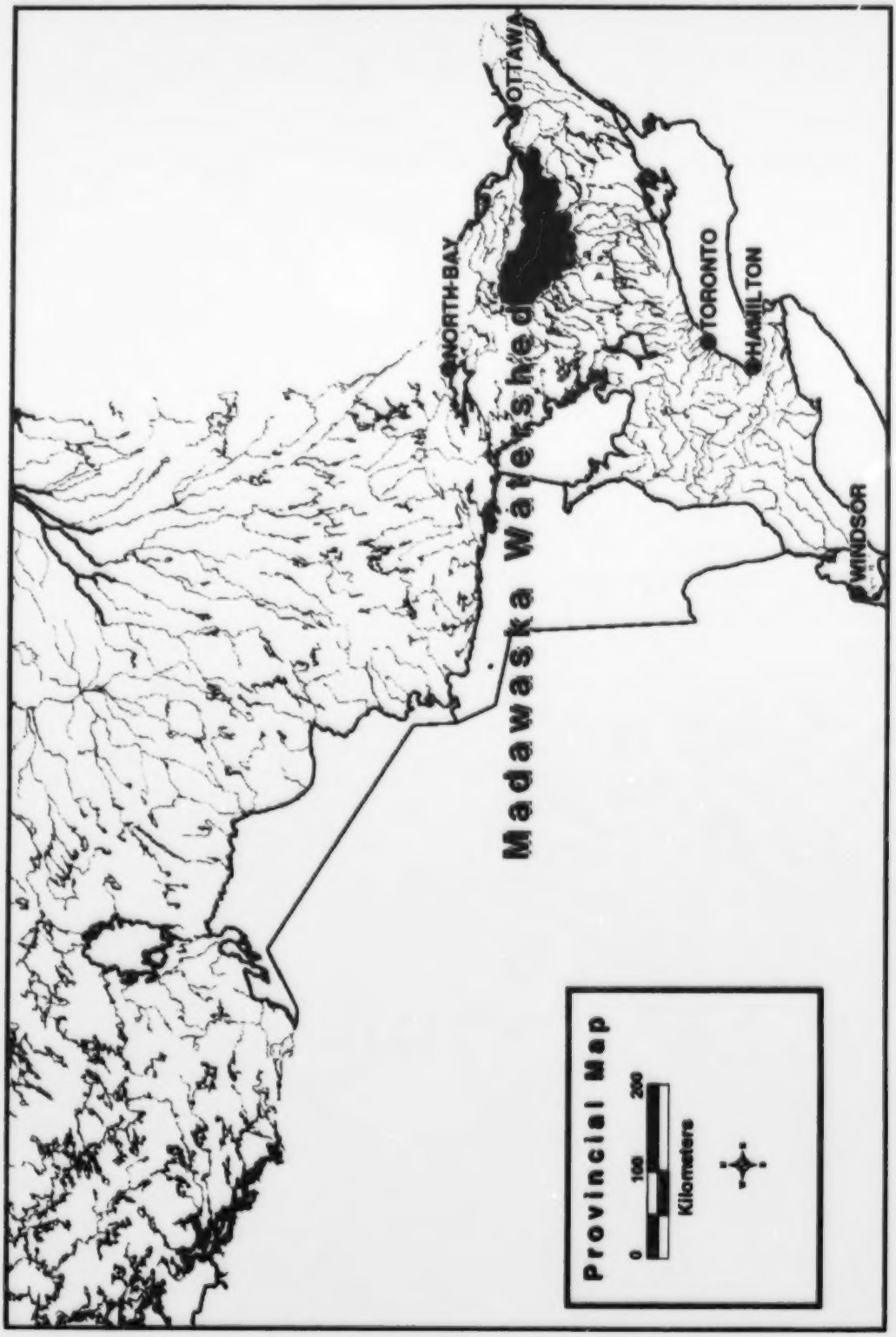
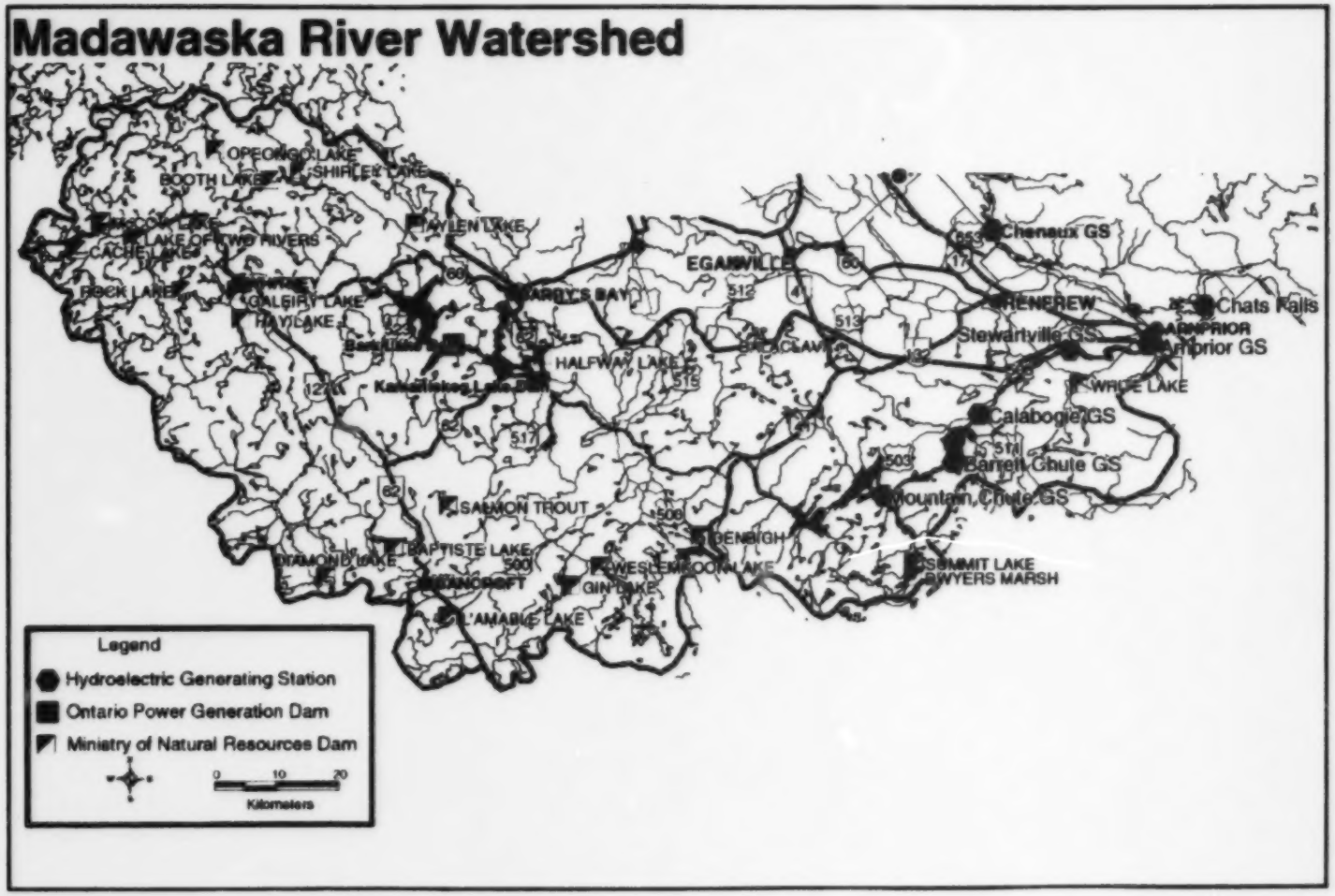


Figure 2
Madawaska Watershed

Figure 3
Madawaska Watershed



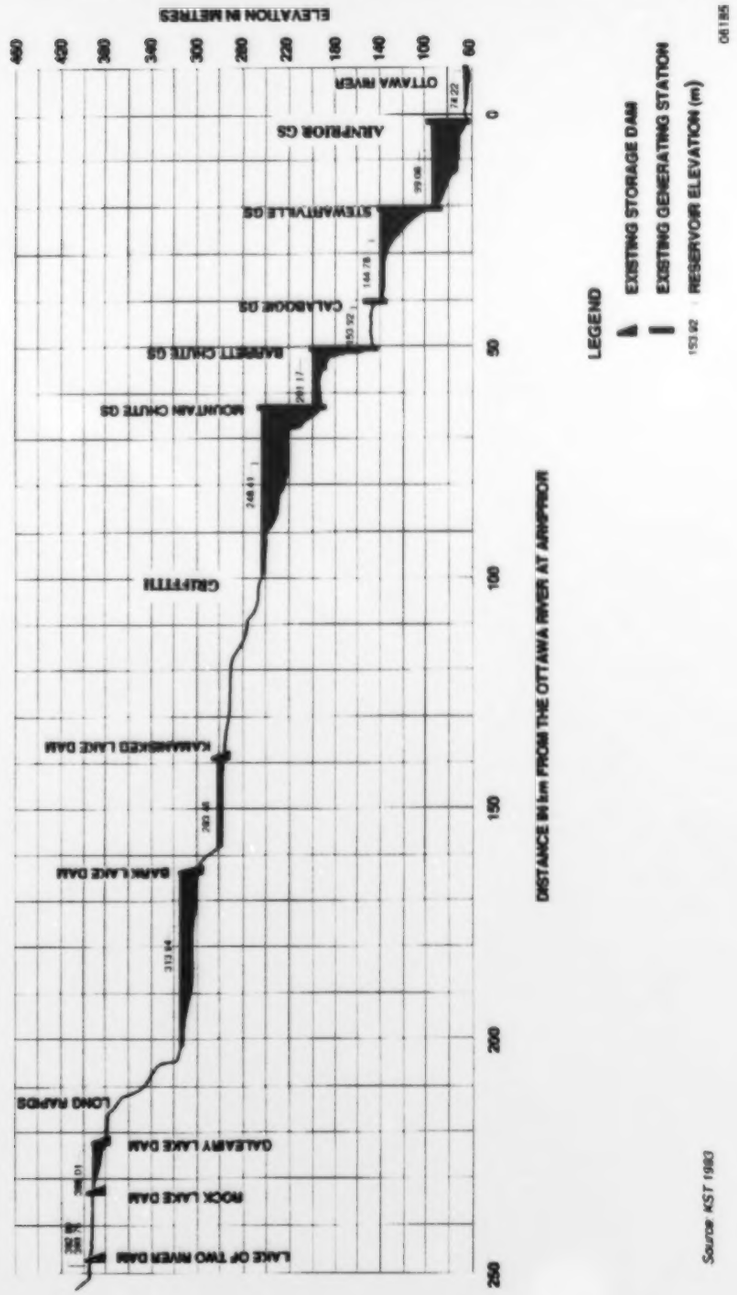


Figure 4
Storage Dams on the Madawaska River
Generating Stations and

2. Provide long-term opportunities for broad public involvement in the river's management

3. Build towards a comprehensive water management plan for the river.

The main competing uses for water management in the Madawaska River are:

- Hydroelectric generation
- Flood control
- Recreation and tourism
- Fish and aquatic ecosystems

Each is described in more detail in the following sections.

2.2.1 Hydroelectric Generation

OPG's Madawaska River generating stations (GS) are scheduled and operated as part of the interconnected electric grid that provides power to customers in the Province of Ontario.

The capacity of the Madawaska River plants is approximately 600 megawatts (Mw). The amount of energy produced is 1 terawatt hour (Twh) which is 3 % of the overall hydroelectric contribution. However, in terms of capacity, the Madawaska represents approximately 10 % of OPG's hydroelectric resources.

The value of energy is a function of many variables and can vary from year to year. OPG 1998 estimates are based on a wholesale rate of $45 / megawatt*hour (Mwh). The Madawaska River energy is therefore worth about $45 million annually. This value is gross revenue and does not take into account OPG's operating costs. Hydroelectric revenue goes into a corporate pool to service OPG's overall corporate needs.

The Madawaska River is an important source of hydroelectric capacity and energy. The stations are operated as peaking plants. They operate less than 24 hours/day except during spring freshet. When the stations are not being run, no water is discharged. The stations usually operate 6 hours or less per day during the summer. A peaking station requires storage for the water during the non-operating period of the day.

OPG operating plans combine all available resources to supply electricity demand in the province and minimize overall fuel cost. OPG has three main sources of energy and capacity to meet the electricity demand in the province; hydroelectric, fossil (coal, oil, combustion turbine) and nuclear. Additional resources can be purchased from other interconnected electric utilities and NUGS (non-utility generators - hydroelectric, natural gas) but are limited.

Electricity demand varies over the day. Demand is highest during morning through early evening and the least during the late evening and early morning. Electricity demand depends on industrial/commercial processes, heating/air conditioning needs and weather factors (wind, illumination, temperature, humidity). Weekdays and weekends have different demand curves. Demand varies over the year. Spring and fall are the lightest load periods because heating and air conditioning needs are less. Historically in Ontario, winter is the highest demand period.

Hydroelectric units are used to match generation to constantly changing electricity demand on the power grid system during the day. Hydroelectric units are important because they start quickly and provide immediate power and energy. Fossil units require 4-6 hours to warm up and then take more time to reach full power. Nuclear units are

designed to operate in either an on or off mode. They provide constant power and do not peak. This type of power is called "base load". If the electricity demand were constant, there would be no requirement for peaking hydroelectric plants.

Because a peaking hydroelectric system must have storage capability, operating flexibility is provided. Because storage is available, energy can be moved from one day to the next, or the following week. This allows OPG to reduce overall production cost by managing equipment outages and/or to meet load requirements during a potentially higher demand day in the future.

Madawaska River hydroelectric plants offer significant operating reserve to the electrical system. Operating reserve is a requirement for stable and reliable system operation and provides for the loss of major blocks of generation such as a large fossil or nuclear unit.

Hydroelectric generation is one of the few renewable sources of energy. It is recognized in the industry as relatively benign environmentally when compared to conventional sources like fossil fuels. Limiting hydroelectric generation likely requires the energy shortfall to be made up with fossil generation and increased acid gas emissions.

2.2.2 Flood Control

Flood control is a major benefit of OPG's hydroelectric facilities for thousands of residents living in the Madawaska River Valley. Flood management is a priority and the protection of human life comes before all other water management issues on the river system.

Bark Lake is the largest flood storage reservoir on the Madawaska River. The lake has a winter drawdown of approximately 9 m providing 4500 cms (cubic metres per second)/days storage. Mountain Chute GS forebay (Centennial Lake) has a winter drawdown of approximately 4.0 m and provides 1200 cms/days storage. The reservoirs are used to store water during the spring freshet and reduce peak flows in the river. The other OPG facilities have some storage but are insignificant for flood control use.

Bark Lake is normally emptied by the end of February. Once the Bark Lake drawdown is complete, Mountain Chute GS is emptied during March. The watershed is monitored continuously for incoming flows in order to assess conditions and manage the water to reduce flooding.

Bark Lake and Kamaniskeg Lake have similar drainage areas, provide similar volumes of water during spring freshet and reach peak flows at approximately the same time. Kamaniskeg Lake has very little storage available and the flows on the York River are not regulated. This means the water reaching Kamaniskeg Lake must be passed downstream.

The water management strategy is to fill Bark Lake while the local inflow to Kamaniskeg Lake rises, peaks and then begins to recede. By holding Bark Lake water until the inflows to Kamaniskeg Lake have peaked and receded, potential flooding on Kamaniskeg Lake and downstream of Palmer Rapids is reduced. Without Bark Lake storage, the inflow into Bark Lake would be added to the Kamaniskeg Lake inflow, substantially increasing the amount of water needed to be passed at Palmer Rapids and therefore more flooding potential on the lake and downstream.

Once the freshet peak is passed, Bark Lake flow is managed to balance the requirement to fill the lake to the summer operating range and cover spawning beds during the incubation period at Bells Rapids. Spawning bed coverage has priority.

2.2.3 Recreation/Tourism

Despite the development of hydroelectric generation facilities, the Madawaska River continues to be perceived as a natural, scenic and wild river within the settings of the Madawaska Highlands, Algonquin Provincial Park and the upper Ottawa Valley, which supports numerous water-based, recreational activities. These activities attract users from the local area and the rest of the province, the USA and overseas, and act as the foundation for a tourism industry that makes an important economic contribution to this region. Consequently, it is important to limit conflicts between hydroelectric generation and recreation/tourism.

A Visitor's Survey, conducted by the Madawaska River Water Management Review in the summer of 1997 listed swimming, sport fishing, boating, canoeing, visiting Algonquin Provincial Park, and whitewater rafting/kayaking as important water-based recreational activities which attract visitors to the river. Other activities include sightseeing, snowmobiling in the winter and hunting (waterfowl) in the autumn. These activities support numerous water-based tourism operations including rental cottages and cabins, commercial lodges and campgrounds, marinas and yacht clubs, kayaking and rafting operations, canoe outfitters, charter boats and sailing tours, public parks and beaches. The influx of tourists attracted to the river also supports other commercial activities indirectly affected by hydroelectric operations such as restaurants, gift shops, off-water motels and guest houses, golf and skiing resorts, and condominium developments.

The nature and intensity of recreational activity varies from river reach to reach. Calabogie Lake and Kamaniskeg Lake are heavily developed for recreation and tourism. Bark Lake has less shoreline development but there are several commercial lodges/campgrounds. Downstream of the weir at Arnprior, the river supports three marinas and a yacht club and is used primarily for boating. As well, there is Madawaska River Waterway Provincial Park between Palmer Rapids and Griffith, which is used extensively for canoeing and kayaking.

Flow and water level management can have positive and negative effects on recreation and tourism. On the positive side, water management during spring freshet provides flood protection to shoreline residences and structures, and reduces bank erosion. The storage reservoirs can be used to provide more constant flows and water levels during the peak summer recreational period. Stable flows and water levels are also provided for boating, canoeing and kayaking. Bark Lake daily discharge is managed by OPG to provide high hourly flows for whitewater kayaking and rafting. Conversely, seasonal, weekly and hourly flow fluctuations at the dams and stations can pose a threat to the sport fishery by affecting the reproductive success of fish or the secondary productivity of the lake littoral zones. High and low flows and water levels may affect boating sailing, canoeing and float plane operations. Beaches, docks and boat ramps may be alternatively flooded or de-watered. The winter drawdown of reservoirs may create dangerous ice conditions for snowmobiling and ice fishing. Water levels that are too constant in the summer may reduce productivity of wetlands for waterfowl while the river may flood waterfowl nests in the spring.

Historically, OPG has tried to accommodate recreation and tourism needs. While some traditional activities such as angling have always been important recreational (and subsistence) activities on the river, recreation and tourism have expanded considerably since the completion of Highway 60 in 1936, and Highways 17 and 41 in more recent years, bringing them into conflict with the power generation industry. Until 1942, Ontario Power Generation operations used the storage of the headwater lakes but conflicts developed from time to time with tourism in general and cottage owners in particular.

In 1942, a decision was made to withdraw from active use of the small headwater lakes and replace them with a single large storage reservoir at Bark Lake. Bark Lake now absorbs most of the impacts of the seasonal water management. To limit seasonal impacts on Bark Lake and downstream lakes, OPG subsequently abandoned the use of the lakes for summer storage, so that water levels are held within a very thin band on most lakes for the primary recreational season of Victoria Day weekend to the Thanksgiving weekend.

Figure 5
Tourism - Madawaska River

Marina, Combermere

Tent - Trailer Camp, Madawaska

Figure 6
Fishing and Kayaking - Madawaska River

In 1962, OPG decided to develop the river for peaking operation. From 1967 to 1977, Mountain Chute GS and Amprior GS were constructed and Barrett Chute GS and Stewartville GS expanded. Peaking operations lead to new conflicts between hydroelectric generation and recreation and tourism.

Angling is intensive on all lakes and reservoirs within the Madawaska system and is a major attraction for tourists. The effect of hydroelectric operations on the sport fishery is an important issue for the Madawaska River Water Management Review. By means of this, MNR and OPG are working together to mitigate problems, enhance habitats and maintain fisheries to sustain angling and recreational opportunities for the future users of the Madawaska River.

2.2.4 Fish and Aquatic Ecosystems

Ecosystem effects are divided into hydroelectric development effects, those resulting from initial construction of the facilities and creation of the reservoirs, and operational effects, those resulting from water management and resulting variation in flows and water levels. Although the review deals strictly with water management, an understanding of past development effects may help to understand the current state of fish communities and aquatic ecology.

2.2.4.1 Development Effects

Nine reaches of the Madawaska River system have been altered by hydroelectric development. Each of these areas is unique in terms of how the pre-developed area was affected by the introduction of hydroelectric dams. Natural river and wetland areas were flooded to create reservoirs, terrestrial lands were converted to aquatic ecosystems, and water was diverted from waterfalls and rapids to power canals leading to the generating stations.

The development of the Madawaska River began with the logging industry in the 1800's followed by the construction of hydroelectric facilities. These activities have changed the natural ecosystems to the present ecosystems. Very little biological information was collected prior to altering the ecosystems of the natural river. This has led to a poor understanding of the original Madawaska River aquatic ecosystems and the life that was supported. Most of the information available is from the last 40 years and is used to manage the present day ecosystems on the Madawaska River.

The creation of new reservoirs (i.e. Lake Madawaska, Norcan Lake, Centennial/Black Donald Lake and Negeek Lake) converted riverine habitat to lacustrine (lake-like) habitat. Flooding of terrestrial soils and vegetation probably led to the release of nutrients and an initial increase in fish productivity (trophic surge) and yield for a few years after flooding, followed by a slow decline to current levels. The creation of these reservoirs flooded many natural habitats such as wetlands, seasonal swamps, rapids and riffles, small lakes and terrestrial upland habitats that existed along the Madawaska River. Some wetlands (Springtown wetland, Griffith's marshes) were created by flooding for dam headponds. The created reservoirs provide habitat for a wide diversity of fish species and the angling opportunities in these lakes are plentiful, however it is unknown what impact the creation of these reservoirs had on the natural fish and wildlife populations that lived in the Madawaska River prior to development.

The construction of dams and generating stations at the inlets and outlets of lakes that existed prior to Ontario Power Generation developments (i.e. Calabogie Lake, Black Donald Lake, Kamaniskeg Lake and Bark Lake) have had known impacts on aquatic ecosystems. The construction of hydroelectric dams has caused the loss of historic fish spawning habitat, extirpation of fish species and changes in the natural water levels on these lakes. Altered and destroyed spawning habitat below some dams has been mitigated by creating walleye spawning shoals. There are habitat losses that cannot be restored, such as historical pike spawning areas, lake trout and

Figure 7
Madawaska River Fish Species

Reach

1 Arnprior/Ottawa River
2 Lake Madawaska/Stewartville tailwater
3 Stewartville headpond/Calabogie tailwater
4 Calabogie Lake/Barrett Chute tailwater
5 Barrett Chute headpond/Mountain Chute tailwater/Norcan Lake
6 Black Donald Lake/Centennial Lake
7 Griffith to Palmer Rapids
8 Kamaniskeg Lake/Conroy Marsh
9 Bark Lake
10 Headwater Lakes

Species	Reach									
	1	2	3	4	5	6	7	8	9	10
lake sturgeon	•	•	•							
lake trout						•		•	•	•
splake				•						
lake whitefish		•				•		•	•	
round whitefish									•	
cisco				•		•		•	•	•
rainbow smelt	•							•	•	
mooneye	•	•								
northern pike	•	•	•	•	•	•	•	•		
muskellunge	•	•				•	•			
white sucker	•	•	•	•	•	•	•	•	•	
longnose sucker						•			•	
silver redhorse	•	•								
river redhorse	•		•	•						
shorthead redhorse	•		•	•						
fallfish		•		•		•		•		
creek chub		•							•	
redbelly dace				•					•	
brassy minnow		•								
golden shiner		•	•	•				•		
fathead minnow	•	•								
bluntnose minnow	•	•	•	•	•			•		
common shiner		•	•			•		•		
emerald shiner	•	•								
spottail shiner	•	•	•							
mimic shiner		•								
blacknose shiner								•		
brown bullhead	•	•		•	•	•	•	•	•	
channel catfish	•	•		•						
stonecat		•								
American eel	•			•						
banded killifish			•					•		
burbot					•	•			•	•
trout-perch				•						
smallmouth bass	•	•	•	•	•	•	•	•	•	•
largemouth bass		•	•	•	•	•		•		
rock bass	•	•	•	•	•	•	•	•		
pumpkinseed	•	•	•	•	•	•	•	•		
walleye	•	•	•	•	•	•	•	•	•	•
yellow perch	•	•	•	•	•	•	•	•	•	
logperch		•	•			•				
Johnny darter	•	•	•							
Iowa darter								•		

walleye spawning shoals. With loss of habitats and dams blocking passage of fish, extirpations of fish species have been documented (i.e. native lake trout, American eel and lake sturgeon).

Hydroelectric development has raised the water levels in all of the reaches. Higher water levels have increased lake areas and created new fish habitat. Wetlands have also been created or enhanced due to the dams impounding these lakes. The Springtown Marsh was likely smaller before the construction of Stewartville GS.

Hydroelectric development diverted water from natural river channels (i.e. Barrett Chute GS -High Falls and Calabogie GS -North Channel) displacing river spawning fish species, including walleye, from their original spawning habitat. At the four largest generating stations, existing spawning habitat may also have been destroyed during channelization of the river immediately downstream of the facility. In recent years, this latter effect has been partially mitigated by the construction of artificial spawning shoals at three stations.

2.2.4.2 Operational Effects

Operating the dams along the Madawaska River affects aquatic ecosystems. The dams have tamed the natural flows of the water passed through the river each year. A natural river would have large uncontrolled volumes of water in the spring, low water levels in summer and water level fluctuations during severe dry or wet weather events. Reservoir operation reduces flooding and stabilizes water levels in some reaches but also creates unnatural seasonal, daily and hourly fluctuations in other reaches. All of these activities have effects on the fish and wildlife communities living in the Madawaska River.

The majority of concerns downstream of Mountain Chute GS result from peaking operations. Peaking operation occurs at four generating stations (Mountain Chute, Barrett Chute, Stewartville, Arnprior). This means the plant is operated less than 24 hr/day. Flows are being discharged through the stations during the day when electricity is in demand. This poses a threat to species like walleye and suckers, which prefer to spawn in strong flows during the spring. Most fish species will spawn during the day when the stations are operating. However walleye prefer to spawn after dark during the off-peak phase of hydroelectric production. During the spawning period, OPG presently runs at least one turbine at night from 9:00 PM to 12:00 PM to provide flows to stimulate walleye spawning at Mountain Chute, Barrett Chute and Stewartville stations.

Upstream of Mountain Chute where water flows do not undergo hourly changes for hydroelectric production, flow management guidelines to enhance walleye spawning are in place or are being assessed. Some sections of the upper river are affected by flows from tributaries, which are not controlled by OPG. MNR and OPG are coordinating efforts to provide enhanced spawning conditions where flows can be managed to improve fish spawning.

Water flows and levels are also managed on a seasonal basis. After the spring spawning period (late April to early May), declining seasonal flows throughout the system coupled with reservoir filling in the upper system and peaking in the lower system, may result in exposure and drying of incubating fish eggs. OPG reduces this risk below some of the dams by forcing fish to spawn at lower elevations in the spring (when incoming flows will permit) and by maintaining higher water levels from downstream dams. Presently, flow management guidelines for each walleye spawning area on the river are being assessed. Through this review, a water management guideline for walleye spawning and incubation will be developed. Water management guidelines will be monitored and an adaptive management approach will be used to improve spawning scenarios for each area.

In the summer, storage capacity in the reservoirs (Bark Lake, Kamaniskeg Lake, Nogeek Lake, Centennial Lake, Norcan Lake) is not normally used for hydroelectric production or flood control. There is no drawdown at this time of year except during energy/capacity emergencies. Peaking operation at the stations does cause frequent changes in flow. The effects of water level fluctuations on summer spawning fish such as smallmouth bass are believed to be small. Small fish species (minnows etc.) and juvenile fish may be stranded along the shore during off-peak operations.

The effects of rapidly changing current velocities on riverine ecology remain largely unstudied.

Extensive winter drawdowns in reservoirs (i.e. Black Donald/Centennial Lake, Bark Lake) affects the ecology of the reservoir littoral zones and shoreline wetlands and may reduce overall productivity of the fish and wildlife communities in these water bodies. Drying and freezing of the wetlands in the winter will have other ecological effects on plants, amphibians, reptiles, invertebrates and furbearers. The rate of filling of reservoirs in the spring is controlled by the competing demands of flood control and recreation use rather than hydroelectric production. However, fish species like Northern pike that spawn in the early spring may not have access to potential wetland and littoral zone habitat. Lake trout have their spawning shoals exposed in reservoirs where winter drawdowns are extensive. The winter drawdowns are required to manage spring water flows in the Madawaska River and are an important component for flood control. Some fish and wildlife communities will be affected by this form of water management. It may be more difficult to mitigate these effects but options can be considered.

Maintaining water levels in a narrow operating band over the summer and winter in lakes and reservoirs for recreational purposes may negatively affect the health of wetlands. Conroy's Marsh is the best example. Maintaining a very stable water level on a riverine system is a very unnatural phenomenon. Marshy wetland and shoreline areas become stagnated. Stagnation of these habitats causes soils to become water-saturated and nutrient-poor, and causes reductions of emergent aquatic plants and the creation of large areas of shallow open water. Fish and wildlife communities dependent on marshy habitats for portions of their life cycle are negatively impacted.

2.3.0 Generic Issues

In the process of compiling a list of issues and concerns and developing solutions, it became apparent that some issues were generic and occurred in many reaches, while others were site-specific.

The document begins with a discussion of generic issues. The descriptions of the issues appear as they were presented through the public consultation process. Site-specific issues and solutions are arranged by river reach in later sections of the document.

2.3.1 Information Needs

Issue Description: "There is a need for additional biological and ecological information in order to effectively address the issues of water level fluctuations on fish populations and aquatic ecosystems on the Madawaska River."

Response:

- The first step is to develop a list of data requirements and a plan to collect and analyze the results. Information needs have been compiled by MNR and OPG including concerns identified through the public consultation process and are catalogued (see Information Needs 3.0).

- Studies have been proposed or initiated as per the Information Needs section. Some of the work has been completed. Operating guidelines have been developed to improve spawning habitat in Bells Rapids downstream of Bark Lake and the North Channel at Calabogie GS. As information becomes available, the intent is to use it to make changes to water management where feasible.

- The public should be consulted if proposed studies have major impacts on current water users, or require a change in water management practice for a significant period of time.

Action:

1. Produce an information needs work program to collect data for 1999 and beyond. Outstanding work programs are to be prioritized and begin the process of delivering results.

2. Review data collection results and develop guidelines where possible to improve aquatic ecosystems. Results of completed studies are to be reported.

2.3.2 Reduced Angling Opportunities

Issue Description: "Reductions in fish populations over time have led to fewer angling opportunities, which are believed to be a product of dam construction/operation (e.g., loss of habitat, water level fluctuations adversely affecting recruitment), high angling pressure and shifts in community structure. Catch-per-unit-effort has declined significantly in a number of reaches and self-reproducing populations have disappeared in some cases."

Response:

- Angling opportunities on the Madawaska River system are abundant. With cold water lakes providing trout fishing and the warm water river and lakes providing bass, pike and walleye fishing, the Madawaska River has a wide diversity of angling opportunities. The problem is the quality of the angling opportunity. This can be affected if fish stocks are depleted due to over-exploitation or if spawning, nursery or foraging habitat is affected by hydroelectric operations.

- Over-exploitation of a lake or river section is a common occurrence on the Madawaska River, especially when applied to walleye, which is the preferred sport fish in the Madawaska River system. When walleye fishing is good in a particular lake or river section, people concentrate their efforts there until the stock is depleted. Typically the anglers move on to the next site they hear is producing walleye. Anglers complain when there are no good fishing sites locally. Only a few areas on the Madawaska River have been subject to over-exploitation of the walleye fishery. Complaints have been fairly localized and OPG and MNR have been able to work with local game and fish clubs in re-establishing good fisheries. The majority of over-exploitation problems on the Madawaska River coincide with a habitat problem. When fish recruitment to a population is limited, it can be easily over-fished. MNR, OPG and local game and fish clubs have completed several walleye spawning habitat projects to improve walleye populations. These efforts have met with some success. Recent angler reports have identified improved walleye fishing in some reaches of the river.

- MNR and OPG are committed to improving angling opportunities on the Madawaska River. Projects for spawning habitat enhancement are underway and more are proposed. Fish are being stocked annually to mitigate loss of spawning habitat. Assessment and monitoring of fish stocks are ongoing. Regulations are being proposed and implemented to protect fisheries from over-exploitation. There are also many under-utilized fisheries on the Madawaska River, such as bullhead fishing in Calabogie Lake. More public education is required to promote other types of fisheries. Through this review, with fisheries at the forefront of many concerns and solutions, angling opportunities on the Madawaska River should benefit. Increases in angling quality and quantity should be an attainable result.

Action:

1. Periodic angler creel surveys are required to measure angling pressure, angler catch and harvest, and to assess regulation of a fishery. Angler Creel Surveys will be identified for specific reaches of the Madawaska River. (see Information Needs 3.0)

2. Regulation of a fishery (i.e. slot-sizes, minimum size limits or reduced creel limits) may be proposed when a fishery has been subject to habitat alteration and/or over-exploitation. Presently a slot size for lake trout on Kamaniskeg Lake and a minimum size limit and reduced creel for walleye on Calabogie Lake are proposed to protect these fish populations. Other regulations may be proposed as information is collected and analyzed through studies on specific reaches identified in the Information Needs document.

3. Stocking of fish in lakes that require rehabilitative stocking (i.e. Calabogie Lake) and in lakes with a "Put, Grow and Take" fishery (i.e. - Bark Lake) will provide good future fisheries.

4. Fish habitat enhancement or habitat creation projects through co-operation of MNR, OPG, Fish and Game Clubs or other interest groups will assist in mitigating altered habitats, and work towards improving sustainable fisheries throughout the Madawaska River system.

2.3.3 Shoreline Erosion

Issue Description: "Concerns about eroding shorelines have been raised throughout the watershed."

Response:

- OPG's Erosion Working Group (EWG) has been established to assess and make recommendations on erosion-related complaints and issues related to OPG hydroelectric facilities. The terms of reference for the Erosion Working Group, assessment process and procedures are included in Appendix 6.5.

- The Ottawa/St. Lawrence Plant Group contact is Jim Whyte (613) 432-8878, ext. 3315. He is the first point of contact with OPG.

Action:

1. MNR and OPG will conduct erosion workshops to assist shoreline dwellers with potential solutions.

2. The EWG Chair will provide an overview of the program to the PAC.

2.3.4 Economic Contribution of Tourism

Issue Description: "There is a need to determine the contributions made to tourism from fish, wildlife, recreation and water-related activities on the Madawaska River".

Response:

- An assessment of economic activity, including tourism, on the Madawaska River will help evaluate tradeoffs between water users involved in operating the Madawaska River generating system in the future. Scoping the study is complete. ("Scoping" defines the terms of reference for the consultant.)

- MNR conducted a Visitor's Survey on the Madawaska River during the summer of 1997.

Action:

1. A consultant has been contracted to perform the study. The report is complete and is available.

Figure 8
Shoreline Erosion and Remediation, Lake Madawaska

2.3.5 Ontario Power Generation's Right to Arbitrarily Draw Down Reservoirs

Issue Description: "There is a concern about Ontario Power Generation's ability to draw down the river reservoirs arbitrarily, with permission from Environment Canada."

Response:

- OPG may not operate in an arbitrary manner.
- Operation of OPG facilities on the Madawaska River is subject to applicable provincial and federal legislation.
- CPG's operations must comply with the relevant sections of Department of Fisheries and Oceans "*Fisheries Act*".
- The Minister of Natural Resources has the authority under *the Lakes and Rivers Improvement Act* to give direction on flows and levels. MNR has the mandate and the authority for water use planning. OPG has a long-standing approach of voluntarily adopting water level and flow target limits to accommodate other uses when proposals or requests have been put forward.
- Ontario's *Public Lands Act* authorizes the disposition of Crown land for a variety of purposes by Sale, Lease or Licence of Occupation (LO) and the granting of water powers. Under the *Act*, MNR has authorized OPG's flooding of Crown land to create water storage through LOs. Storage facilities that have hydroelectric generating capability are authorized under Water Power Lease Agreements (WPLA).
- The Ontario Ministry of the Environment administers the Environmental Assessment Act. The Act requires OPG to prepare an assessment of the potential environmental impact of a project. MNR and OPG's dams on the Madawaska River were constructed prior to the Act coming into force in 1976.
- The top of the operating range is usually defined in LO or WPLA. The lower operating limit has usually evolved over time as a function of equipment or the structure. The Minister may revoke a Licence if it is in the public interest. OPG voluntarily operates its reservoirs on the Madawaska River to meet citizenship and environmental concerns. Examples are restricted summer ranges for recreation and flows/levels to enhance fish reproduction. These will define the lower limit of the operating range during specific times of the year.

Action:

1. Refer to Sections 2.3.7 & 2.3.8.

2.3.6 What Effect Will Privatization have on Water Management on the Madawaska River

Issue Description: "There is a public concern that the present water management on the Madawaska, and the changes proposed during the review will not be carried forward to new owners, should OPG be privatized and hydroelectric assets be sold."

Response:

- No privatization is planned in the near future. However, there is no expected impact on water management due to competition in the energy market or possible privatization.

- The water management plan to be developed from the review will be a published document that describes the operating criteria for the river. OPG has voluntarily adopted water level and flow limits to deal with environmental and citizenship concerns. Limits will be identified in the plan.

- MNR is the regulatory authority that governs water management in the province. The water management plan shall be made to apply by MNR to the Madawaska River for any new owner.

- Dams are governed by the provisions of the *Public Lands Act*, *Lakes and Rivers Improvement Act* and the federal *Fisheries Act*. Federal and provincial legislation must be satisfied by any agency operating dams on the Madawaska River or any other river in Ontario. Existing Water Power Lease Agreements are non-transferable without the consent of all parties. In addition "the Minister of Natural Resources may cancel or revoke a licence (Licence of Occupation) if the Minister deems it to be in the public interest." (A Licence of Occupation is the tenure document issued under the *Public Lands Act*, which allows the dam structure to occupy Crown riverbed. The *Lakes and Rivers Improvement Act* gives location and design approval.)

Action:

1. MNR and representatives of Ontario's water power industry, including OPG, are reviewing government policies on water management planning, including dam operations. The bipartisan "task force" is scheduled to report its findings in 1999. (at time of printing, this report has not yet been released.)

2. Its recommendations are expected to reinforce the government and industry commitment on moving toward "self-regulation" of the industry under stringent standards set by the government in consultation with other stakeholders within the watersheds affected.

2.3.7 There is a Need to Create Greater Public Understanding of Why and How the River is Operated in the Manner that it is.

Issue Description: "There is insufficient public understanding of why and how the stations are operated the way they are, and how the river's reaches are related. The river environment has been altered greatly since the first dam was constructed. The dams act as barriers to the movement of fish species. OPG operates peaking generating stations which means they discharge water significantly less than 24 hours in a day. Summer operation is generally a few hours each day."

Response:

- MNR and OPG have recognized the need to create a greater public understanding of how and why the river is operated. The Madawaska River Water Management Review is part of a process to improve the public's understanding of how water is managed in the Madawaska River Watershed. To ensure that happens, a communications plan has been drafted that includes public involvement activities.

- An Internet website is being created specifically to provide information on the Madawaska River Water Management Review process and OPG's operation of the Madawaska River. Explanations of why and how OPG operates will be provided for background information. The website will provide links to other websites with regularly updated bulletins about levels and flows.

Action

1. An action plan will be developed for providing information to the public in the future.

2. OPG is committed to maintaining the Internet website that will be available in the summer of 1999.

3. The website will include a summary of the Madawaska Water Management Review, with directions to the complete document for those interested in acquiring a copy.

2.3.8 Mechanism for Long-Term Public Involvement in Water Management on the River

Issue Description: "There is a need to ensure that the public awareness which is generated as a result of the water management review is maintained, and to provide on-going opportunities for the public to give advice to the agencies on the best ways to address problems and issues."

Response:

- MNR and OPG agree on the principle of public participation. Public involvement and participation are key elements in the development of the plan. Providing long term opportunities for broad public involvement in the river's management is a stated objective.

- A Public Advisory Committee has been established to assist and support OPG and MNR in obtaining a broad base of information from the general public, and other organizations who have an interest in the management of the river.

- After the PAC process is completed, a Standing Advisory Committee will be established to monitor the implementation of the water management plan and identify issues that require attention.

- Concerns and issues need to be documented and tracked in one place to ensure continuity and completeness as a future reference. A database of calls, letters or other public communication on water levels, flows, fish habitat or any other watershed issue needs to be established.

- The website described in the previous section can be developed for public input. A 1-800 phone number for public input could be provided as alternative means of communication.

Action:

1. The website developed for the previous section will have the capability for the public to provide comment on-line. There will be a summary of the Madawaska Water Management Review along with directions to the complete document for those interested.

2. Install and make the public aware of 1-800 phone line for input.

3. Form a Standing Advisory Committee for water management on the Madawaska River with Terms of Reference to define activities.

4. OPG and MNR will each develop a process to log communications from the public. (It was the intent to establish a single data base but legislation restrictions, standards and requirements specific to each agency make this prohibitive.)

2.3.9 Effect of Water Level Fluctuations on Riparians

Issue Description: "Water level fluctuations can create problems for riparians who have structures below the high water mark or near shorelines. Ice and elevated water levels can damage tourist operators and cottagers' docks, boat houses and associated infrastructure, create floating debris, reduce the size of beaches, etc. There are site-specific challenges in determining the appropriate limits to development. No flood risk mapping has been prepared for any portion of the river."

Response:

- Water level fluctuations are addressed in various reaches as site-specific issues. Most water level complaints are received during the summer period. The major reservoirs operated by OPG have summer ranges that restrict water fluctuations during the prime tourist season, from the May long weekend to Thanksgiving weekend.

- Flood risk mapping is available from MNR for the Griffith area and at Arnprior. Providing development limits and additional flood risk mapping is outside the scope of the water management review.

- Ice damage occurs periodically on rivers and lakes. OPG does not manage water levels to protect permanent structures along rivers and lake shorelines during the ice season.

- Removable floating dock systems are recommended to avoid ice damage associated with fixed docks.

Action:

1. MNR will hold a seminar for interested riparians on floating docks and recommended designs.

2.3.10 Generating Station/Dam Portage Routes

Issue Description: "At some if not all generating stations/dams, there are safety booms, shoreline signs and fencing both upstream and downstream from these sites that establish zones prohibiting public entry. These effectively prevent boat travel between river reaches."

Response

- OPG produced a brochure in 1982 showing portage routes on the Madawaska River. The routes shown are in poor condition with over grown foliage and blocked access in some locations. There is an economic benefit to being able to promote the entire Madawaska River for passage by canoe.

- The river reaches have to be examined and routes re-established further away from OPG facilities as part of a due diligence process. Safety booms and signs can be redone.

- OPG is concerned about safety issues. A safe route around each facility will be established. A revised brochure will be made available showing safe portages around each generating and storage facility.

Action:

1. OPG will open portage routes (subject to satisfying public safety concerns) with appropriate signs around facilities it controls on the Madawaska River. A brochure will be completed that identifies locations and gives clear directions. MNR will help with clearing the portage routes.

2. OPG will facilitate access to portage routes on adjacent private lands.

2.3.11 Access to Water Level Forecasts

Issue Description: "Inflow forecasting is done by OPG on a continuous basis for daily, weekly and longer periods, to manage water levels in the reaches of the Madawaska River to within specified limits. River users do not have access to this elevation information for the purposes of planning their activities along the river."

Response:

- OPG has agreed in principle to make longer term forecasts of water level and flow information available to the general public. The information can be made available by a 1-800 number for phone access, combined with an Internet website. The website can be updated daily and 1-800 number updated weekly.

- A paper copy can be issued/retrieved for posting in strategic locations (i.e. municipal offices, libraries, Griffith General Store). Water level forecasts will be made available in a usable format.

Action

1. The OPG website and 1-800 phone access will be made available for water level and flow forecasts in spring 2000.

2. The distribution and posting of paper copies of water level forecasts need to be developed.

2.3.12 Water Level Recording relative to Peak River Use by People

Issue Description: "Water level elevations are collected daily at midnight. This does not correspond with the peak period of usage (i.e., mid-day) of the river by other users."

Response:

- OPG's historic water levels records have one reading to reflect the operation during a given day. Water levels are monitored throughout the day and the water level data stored is usually hour 24. OPG uses the midnight water levels to calculate inflows on a daily basis to monitor supply conditions. This format coincides with the requirement to provide an hourly operational schedule for the hydroelectric stations on a daily basis.

- The daily water level fluctuation is not reflected in the historic record of operation. Short-term information is available to determine the approximate maximum and minimum levels during the day. Upgraded information systems will be installed in the future that will have hourly resolution to measure water level and determine a range of fluctuation more accurately. These data will be kept for a period of time, up to one year, for review purposes.

Action:

1. OPG will review hourly data recording requirements for the future. In the short term, OPG will provide annual operating reports showing the range of daily water level fluctuations.

2.3.13 Requests for Flows for Various Uses/Users

Issue Description: "The method of balancing the needs of upstream and downstream users, while providing specific flow requests and maintaining a measure of operating flexibility, need to be reviewed. There is a move towards the principle of "user pay" for commercial users, to recover costs."

Response

- The balancing process involves negotiating a compromise acceptable to both affected parties. Upstream and downstream users must understand the impacts of flow requests on one another. Any compromise must take into account the potential impacts on the entire watershed, not just the immediately affected area, so that other users are not adversely impacted.

- The recovery of the costs incurred by OPG to provide a specific flow may become necessary. OPG may seek to recover costs and/or any loss of revenue from a commercial operation.

Action:

1. Issues will be resolved as they develop.

2.3.14 Water Management Models

Issue Description: "Existing computer models used by OPG do not explicitly address environmental concerns."

Response:

- OPG's water management computer models take environmental concerns into account in terms of water level or flow targets. Fishery habitat impact data have been collected from flow tests to determine suitable conditions followed by implementing appropriate level or flow constraints. The simulation models developed by OPG are used to determine the risk of causing environmental problems under a variety of operating strategies.

- Information from planned studies will be incorporated into current models as water level and flow constraints are developed, to review the impact of water management plans on habitat.

- The present models are used to simulate river levels and flows given a preferred operating strategy. Risk of exceeding limits is calculated by using historical series of inflows and simulating the operation of all reservoirs in the entire watershed.

- Water management models/processes used by other utilities are being reviewed for application to keep abreast of new developments.

Action:

1. Water management models will incorporate new operating criteria as they are developed from information needs studies.

2.3.15 Decision Making Information

Issue Description: "What data/information on social, economic, cultural, recreational uses (i.e. people's preferences for management) of the river is required to ensure that a balance is achieved among various uses/interests when making decisions on water management."

Response:

- The Madawaska River economic activity study contracted by OPG will provide an assessment to potentially help evaluate tradeoffs regarding flows and levels between affected users and regions along the river.

- A Visitor Survey has been completed to get comments and concerns from seasonal users in the Madawaska Valley.

Action:

1. The economic activity study will be completed in March 1999.

2. Conduct additional surveys periodically to measure activity.

2.3.16 Dam Operating Documents

Issue Description: "Current operating documents contain site-specific user and species-requirements, established in response to specific concerns. These documents need to incorporate principles of managing water for sustainability."

Response:

- The concept of sustainability is applied during the water management review to develop a plan. The plan will identify operating criteria OPG is to follow at control points in the watershed to achieve the objective of sustainability.

- OPG's operating documents will include the operating criteria developed in the water management plan but will not include comments on sustainability. Operating documents are intended for OPG staff and must be clear to avoid misinterpretation.

- An example of operating criteria is the requirement for the Stewartville G.S. forebay not to be lowered below 144.0 m to enhance pike spawning habitat in the Springtown Marsh. The instruction does not discuss sustainability, but the result of following the level criteria will improve the resource and achieve the principle of sustainability.

Action:

1. No action is planned.

2.3.17 Protocol for Inter-Agency Communications During Spring Freshet and Walleye Spawning/Incubation

Issue Description: "Notification by MNR staff (i.e. Algonquin Provincial Park and Bancroft District) of flow changes to OPG staff (Toronto and Chenaux) is important to help reduce flooding in the spring dur -ing high water years. Frequent communication between the organizations (MNR Pembroke and OPG Toronto/Chenaux) is needed during walleye spawning and egg incubation."

Response:

- Frequent discussion between OPG and MNR staff at Whitney, Algonquin Provincial Park and Bancroft who control the headwater lakes take place during spring freshet. Conversations are held to review operating plans and coordinate flows and levels in the Madawaska River as needed.
- OPG has an operating procedure in place that outlines the requirements for walleye spawning on the Madawaska River and describes the role of MNR and contact points.
- Regular telephone calls will occur among the Walleye Watch participants, MNR and OPG to update spawning conditions and coordinate appropriate river flows.

Action:

1. OPG will draft an operating procedure describing requirement and contact names/phone numbers for MNR/OPG communication during freshet
2. OPG will draft an updated walleye spawning operating procedure and forward it to MNR, including the Walleye Watch regular telephone calls.
3. MNR will notify the public of opportunities to participate in the Walleye Watch and other related projects. (Requirements for participating in the Walleye Watch are included in the Appendix 6.6).
4. Results of the Walleye Watches are to be reported and made available to the public on request. A method of providing the information is to be developed.
5. The dam operating documents will be updated periodically to reflect new operating criteria that reflect the concept of applying fisheries sustainability.

2.3.18 Managing Water Levels to Within Specified Operating Limits in Extreme Wet or Dry Weather Years

Issue Description: "Extreme wet and dry years present additional challenges to water managers balancing citizenship and environmental commitments. Achieving and maintaining a balance in water supply among a range of uses/interests on the river can be difficult, given the recognition that supplies (inflows) are continually changing."

Response:

- Level and flow constraints may be exceeded during extreme flood or drought conditions, despite current or future water management tools and methods.
- Watershed conditions in terms of flow and level are monitored continuously by OPG to determine changes in water supply. The gauges are at control sites in the watershed.

- Precipitation forecasts combined with computer simulation models allow risk assessments to be calculated under a variety of operating scenarios from Bark Lake to Arnprior GS. The process is repeated as often as necessary. Operating strategies are changed as inflow conditions change.

- During freshet, the Madawaska River is managed in conjunction with the Ottawa River for flow control. The additional resources of Hydro-Quebec and the Ottawa River Regulating Committee for inflow forecasting are used to guide operations.

Action:

1. OPG is reviewing its water management tools to identify areas that can be improved. A development program to build an improved computer-based water management decision support system is under way.

2.3.19 Maximum and Minimum Water Level Elevation of OPG Controlled Reservoirs

Issue Description: " Maximum elevations for flooding are established in licences of occupation issued by MNR. The minimums have been established by OPG and modified from time-to-time based upon responses to various concerns raised by MNR and the public".

Response:

- The range of water levels for OPG's structures is defined in operating documents. The upper limit is usually at or below the limit defined in the Licence of Occupation or Water Power Lease Agreements. Within the operating range, some locations have defined flood storage and energy emergency storage.

- The operating limits vary seasonally and are defined either by the equipment/structure requirements, by voluntary citizenship or environmental requirements.

Action:

1. Defining, confirming and/or further refinement of limits and constraints is a product of the water management review and will be included in the plan.

2.3.20 Mechanism for Addressing Destruction of Fish Habitat

Description: There is a need to ensure that the water management plan complies with the requirements of the Department of Fisheries and Oceans. Section 35 of the Fisheries Act requires that authorization from the Minister of Fisheries and Oceans be obtained prior to undertaking any work or action that would result in the harmful alteration, disruption or destruction of fish habitat.

Response:

- Section 35 of the federal *Fisheries Act* addresses the destruction of fish habitat. Essentially, the section says it is illegal to destroy fish habitat unless authorized by the Minister of Fisheries and Oceans. Section 35 (1) indicates that "no person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat". Section 35 (2) indicates that "no person contravenes subsection (1) by causing the alteration, disruption or destruction of fish habitat by any

means or under any conditions authorized by the Minister or under regulations made by the Governor in Council under this Act". Other relevant and applicable sections of the *Fisheries Act* include sections 20, 21, which deal with the need for safe fish passage and minimum flow requirements, section 22, which also deals with minimum flow requirements, section 27, protection of fish in or near fish ways, section 30, fish guards and screens, section 32, destruction of fish habitat and section 36, deleterious substances. The full text of these sections can be found in the Appendix 6.10.

- The *Act* is administered through the Department of Fisheries and Oceans' (DFO) Policy for the Management of Fish Habitat. The objective of the Policy is to achieve a Net Gain of habitat for Canada's fisheries users in a manner that will be of benefit to all users. It is also a blueprint for a commonsense, cooperative approach between the private sector and various levels of government. DFO recognizes that the policy would have potential impact on regional development, industrial and other resource sectors, and public projects. DFO pledged to consider the interests of other resource users while striving to maintain and improve the productive capacity of fish habitats.

- The guiding principle of the policy is "no net loss of the productive capacity of habitats". DFO applies this principal to proposed works and undertakings. Recognizing the difficulty in evaluating and quantifying impacts from existing facilities, and the potential for economic disruption, DFO has not applied the principle retroactively to approved or completed projects. OPG has voluntarily adopted changes in water management to mitigate the effects from existing projects on fish habitat with the assistance of MNR (i.e. - Madawaska River).

- OPG has not requested *Fisheries Act* authorization for the destruction of fish habitat from existing operations. DFO has not yet developed such a process for existing operations in Canada. OPG is committed to sustainable development including the protection of fish and fish habitat. The Madawaska River Water Management Review has been developed in partnership with MNR as one approach to achieve the objectives of Fish Habitat Policy (see Appendix 6.9).

Action:

1. DFO will review the draft document for consistency with the Policy for the Management of Fish Habitat.

2.3.21 Flow and Water Level Effects on Non-Aquatic Wildlife

Issue Description: "The focus seems to be on aquatic life. Has any research been done on the effects of water level fluctuations on other wildlife species (i.e. - poor fish populations effect on species which prey on fish)."

Response:

- Biologists usually discriminate between aquatic and terrestrial communities. The aquatic community may contain many non-fish organisms such as invertebrates (bugs), amphibians (frogs), reptiles (turtles), birds (ducks, herons, etc.) and mammals (muskrat, mink, etc.). Aquatic species are dependent on aquatic habitats for their existence. Terrestrial species may also utilize resources from aquatic habitats and communities but are usually not dependent on them.
- While many of the concerns in the review deal with game fish, concerns about the effects of flow management on other fish species, aquatic plants, invertebrates, amphibians, turtles, aquatic birds and waterfowl, and aquatic mammals such as muskrat, beaver, mink etc. are addressed. Issues have already been raised about non-fish components of the aquatic community. OPG has previously intro-

duced constraints on operations to protect many of them (i.e. - Conroy's Marsh winter and spring management). Much of the interest has been in species with resource value (furbearers, ducks, wild rice). There is a proposal to look at broader issues such as general wetland ecology. Two studies have already been initiated on wetlands in the system.

- The river may also be important to terrestrial species that utilize aquatic resources (i.e. - moose, eagle, raccoon, etc.). Little consideration has been given to these species to date. If we can protect fish and other aquatic species, terrestrial species should also be protected.

Action:

1. MNR/OPG will conduct a literature search to determine if any research has been done on this topic. This search, including the internet, found no listing of information specific to the impact of water levels on non-aquatic species. However, it was determined that, by doing a search of individual non-aquatic species, information relating to those species and the effects of water level fluctuations, could be found for some species. To provide a comprehensive, complete list of all literature on non-aquatic species would not be meaningful to this initiative.

2.3.22 Stewardship and Volunteer Opportunities

Issue Description: " Members of the Public Advisory Committee would like to be made aware of any stewardship or volunteer opportunities which may arise on the Madawaska River."

Response:

- A list of contact names and organizations will be provided so that members can keep up to date on any opportunities to volunteer that might be available on the Madawaska River.

Action:

1. MNR will provide the Renfrew County Stewardship Council membership list and contacts to the PAC (see Appendix 6.8).

2. MNR will provide Community Fisheries and Wildlife Involvement Program (CFWIP) information to PAC members (see Appendix 6.7).

2.3.23 Alternative Hydro Projects

Issue Description: "Alternative hydro projects should be researched, such as small generators that do not need to span an entire river and are used in some locations. There are several examples being used in the United States. These have a less detrimental effect on the environment and can service a small community (500 - 1000 population) on an independent grid."

Response:

- The subject is beyond the scope of this review, but there is abundant information available on Internet websites and in newsletters.

Action:

1. No action is planned.

2.3.24 Need for More Research and Data Collection

Issue Description: "There is a lack of data on fauna along the watercourse as well as a need for more research on the ecosystem, biology and hydrology of the area. More and up-to-date information will help in the decision making process."

Response:

- The need for more research and data collection has been noted.
- Results of current and on-going research must be available to the public.
- The Information Needs Document will be updated as new research is completed and additional needs are identified.

Action:

1. An Information Needs Document has been developed and some of the proposed work has been completed or is scheduled to be completed in the near future.

2.3.25 Inadequate Control of Tributaries During Spring Runoff

Issue Description: "More work needs to be done on the impact of inflows from the York River and tributaries from Algonquin Provincial Park, Opeongo Lake and watersheds in the Bancroft District."

Response:

- OPG's management of the flow of water in the Madawaska River is coordinated with MNR-controlled headwater lakes (since the freshet of 1998).
- There is a concern about the impact of high York River flows on Kamaniskeg Lake and locations downstream. The problem is a function of storage facilities on this tributary. There is not enough storage to capture and redistribute the natural flow over a longer period at a reduced rate. Construction of storage facilities is beyond the scope of this review.

Action:

1. The operation of the Baptiste Lake dam will be reviewed to see if it can be used to reduce York River peak freshet flow.

2.3.26 Need for Overall Madawaska River Watershed Plan

Description: There should be an overall Madawaska River Watershed Plan.

Response:

- The Madawaska River Water Management Review is being undertaken as a result of issues and concerns that relate specifically to the river. A Watershed Plan has a broader scope that includes land use planning. Municipal planning processes and the Madawaska Highlands Land Use Plan are in place to address land use concerns relating to remainder of the watershed.

Action:

1. Private land use concerns are to be directed to the appropriate, accountable municipal government.

2. Section 2.3.17 addresses the issue of developing a protocol between MNR and OPG for changing water levels relating to the spring freshet and the impact of fish spawning, but it does not mention low water level conditions.

2.4.0 Ottawa River to Arnprior Generating Station (GS) - Reach 1

2.4.1 Effect of Fluctuations in Water Flows on Fish Populations

Issue Description: " Walleye from the Ottawa River are known to spawn below the weir below the Arnprior GS dam, and lake sturgeon are suspected to spawn in the area as well. It is believed that the backwater effect from the Ottawa River (Chats Falls GS operation) covers the spawning beds; the impact of fluctuations in water flows on spawning is not known."

Response:

- Walleye spawning beds were installed by OPG downstream of the weir below Arnprior GS in 1976 when the station was constructed. Chats Lake (Ottawa River) water levels control the levels in this reach. OPG has not received any concerns since water levels in Chats Lake rise with spring freshet and cover the spawning bed.

- Arnprior Fish and Game Club was contacted and did not have any concerns about the operation of Arnprior GS and spawning bed coverage downstream of the weir. It appears to work well.

Action:

1. No action is required.

2.4.2 Flow Regulation to Dilute Effluent from Arnprior Sewage Treatment Plant (STP)

Issue Description: "To ensure effluent from Arnprior STP is diluted to meet Ministry of the Environment (MOE) Provincial Water Quality Objectives, OPG discharges 212.4 cms for one hour, with no two consecutive discharges more than 24 hours apart. This STP is currently being upgraded."

Response:

- OPG's initial proposal to MOE was to pass a minimum of 212 cms for one hour every 24 hours from Arnprior GS for water quality concerns. MOE has directed OPG to maintain the minimum flow as proposed until further evaluation work is completed.

Action:

1. MOE will test the flow requirement and determine if pollution dilution specifications are met.

2. MNR and the local fish and game club will continue to monitor the area.

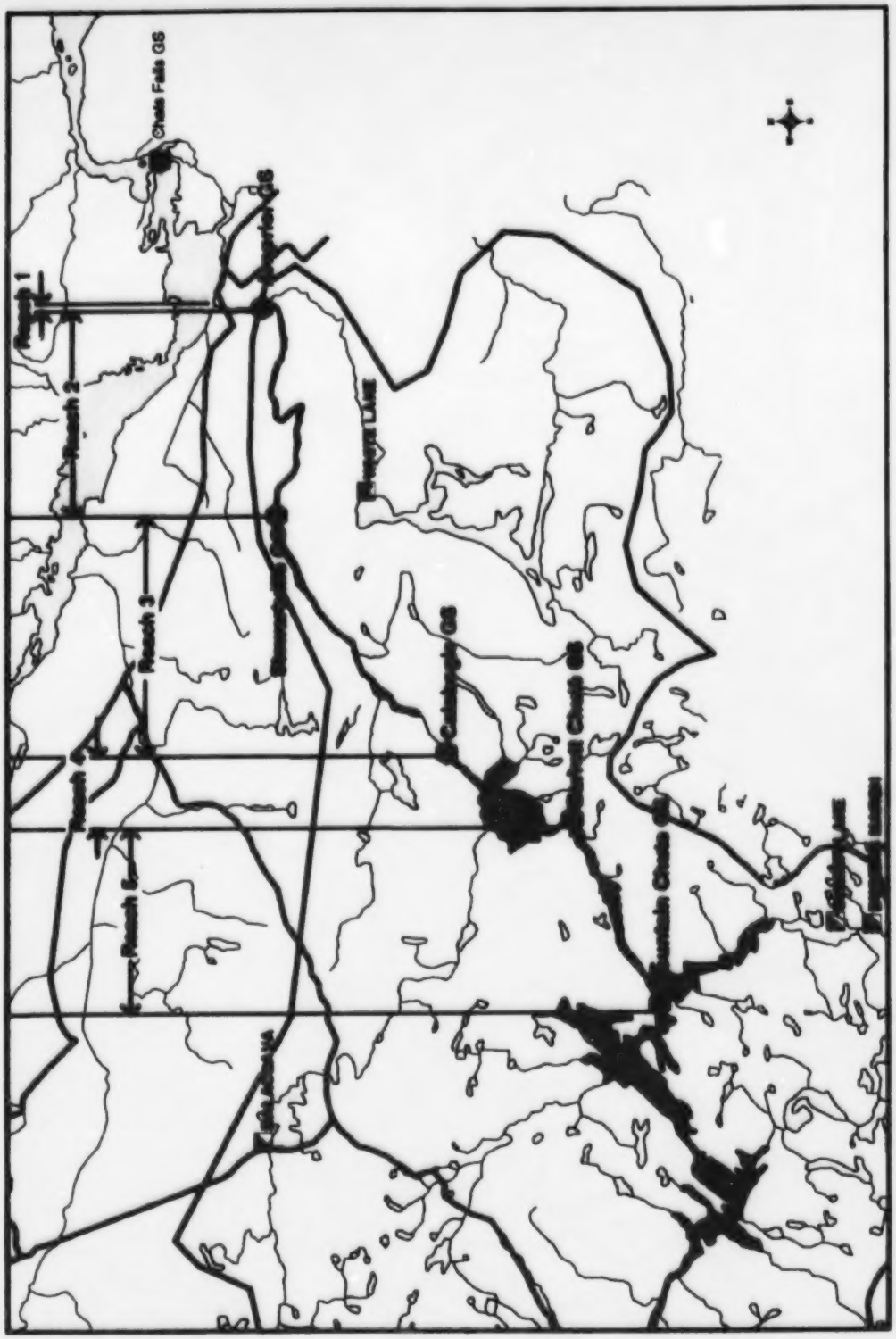

Chats Falls GS
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Barrett Chute GS
Bryanston GS
Otto Holden GS
Des Joachims GS
Mountain Chute GS
Rocheux GS
Lac Coulonge GS
Lac des Quinze GS
Lac Dumoine GS
Lac Kipawa GS
Lac Simard GS
Lac Témiscamingue GS
Rapides-des-Joachims GS
Rapides-Farmer GS
Rapides-Farmer GS
Rapides-des-Quinze GS
Rapides-des-Quinze GS
Rapides-des-Quinze

Figure 10
Arnprior Weir

2.4.3 Flow Regulation to Facilitate Boating and Docking at Chats Lake Yacht Club and Marina

Issue Description: "High flows from the Arnprior GS make boating and docking at the marina and yacht club difficult."

Response:

- OPG has voluntarily limited the operation of Arnprior GS to one unit from May long weekend to Labour Day, to avoid high velocities downstream and making docking difficult at the Marina and Yacht Club.
- Arnprior GS has 2 generating units. The second unit is operated if there is more water than one unit can pass in 24 hours or during an energy shortage.

Action:

1. Advise other marina operators of Arnprior GS summer operating rules.

2.4.4 Shoreline Erosion

Issue Description: "Eroding shorelines on residential properties."

Response:

- OPG limits single unit operation from spring freshet onward as per current operation (minimize running the second unit) to limit shoreline erosion.
- Erosion problems due to OPG's operation will be addressed by OPG's Erosion Working Group (EWG).

Action:

1. Erosion concerns to be forwarded to the EWG.
2. Refer to section 2.3.3.

2.5.0 Arnprior GS to Stewartville GS - Reach 2

2.5.1 Fish Populations in Tributaries of Lake Madawaska

Issue Description: "Lack of information on the use of tributaries that flow into Lake Madawaska (i.e. - Waba Creek) by fish for spawning purposes and the relative contribution of these areas to the fish populations."

Response:

- A detailed assessment of Lake Madawaska fish stocks was conducted by OPG in 1977 a year after creation of the reservoir. Additional surveys have been conducted by MNR and the Arnprior Fish and

Game Club in 1985 and 1988.

- Lake Madawaska walleye and other species have been observed to spawn in the Stewartville GS tailwater but the use of other tributaries is unknown.

- The PAC recommends regular assessments of this reach and others in the watershed with public access to the results (see Information Needs Document).

- Arnprior Fish and Game Club has applied for a permit (1998) to build a spawning bed on Waba Creek.

Action:

1. Under MNR supervision, conduct preliminary studies using local fish and game club members, property owners, etc. to determine extent of use of tributaries for spawning.

2. Assessment reports will be distributed to the public on request.

3. Develop a Walleye Watch program for the Lake Madawaska tributaries.

4. MNR will conduct periodic assessments to establish age class data on walleye for assessing recruitment and the success of annual reproduction (see Information Needs Section)

2.5.2 Efficiency of Rehabilitation Work on Walleye Spawning Beds and Effect of Flow Management

Issue Description: "Under MNR's Community Fisheries and Wildlife Involvement Program (CFWIP), the Arnprior Fish and Game Club has worked over a number of years with MNR to rehabilitate and establish new spawning beds for walleye below the Stewartville GS. "Walleye Watchers" have monitored the number of walleye spawning on shoals each year. However, walleye reproduction success as a function of spring peaking operations and water level fluctuations and the contribution to the Lake Madawaska stock is not known."

Response:

- The Lake Madawaska assessment study referenced in the Information Needs Document will provide data on walleye recruitment success.

- An operating guideline for walleye spawning has been developed and verified in 1997 for Stewartville GS to enhance walleye spawning
- During low flow freshet, operate 1 small unit (56 cms) from 21:00 hr. to 24:00 hr. during walleye spawning.

- During moderate freshet years , operate 1 large unit (100 cms) from 21:00 hr. to 24:00 hr. during walleye spawning.

- Turning units off at the station will be staged in 10 minute increments to keep the spawning shoal covered.

Action:

1. Guidelines will be reviewed and modified based on further assessment and results of Walleye

Figure 11
Forebay and Arnprior GS

Lake Madawaska

Arnprior GS

Watch.

2.5.3 Effect of Testing the Stewartville GS Spillway on Fish Spawning Shoal

Issue Description: "The new spawning shoal constructed below the Stewartville GS is immediately downstream of the emergency spillway. The spillway would be used in the event of flooding or other emergency conditions. The location of the shoal may prevent OPG from being able to periodically test the working condition of the mechanical sluices."

Response:

- The gates will be partially tested at the start of freshet. A full test will be conducted every 5 years after spawning and incubation has been completed.

Action:

1. MNR will do an elevation profile of the spawning bed at Stewartville prior to a full test of the spillway to document existing conditions, and then again after the full test to determine if further rehabilitation work is required.

2. Any adverse impacts on installed spawning shoals under 'emergency' conditions will be repaired by OPG.

3. MNR will be notified by OPG of any spill in order to assess the spawning shoal.

2.5.4 Deterioration of Existing Shoreline Erosion Protection Works Along Lake Madawaska

Issue Description: "Protection works in need of repair on residential lands fronting on Lake Madawaska."

Response:

- Some of the marine clay banks have been repaired by installing rip-rap protection to reduce erosion. The area is surveyed periodically by OPG with repairs programmed to ensure private landholders are not affected.

Action:

1. The erosion control program is ongoing.

2.6.0 Stewartville GS to Calabogie GS - Reach

2.6.1 Mid-Day Water Levels from June to September

Issue Description: "River use for recreation peaks in the summer months, and on a daily basis, occurs mostly between 9 A.M. and 6 P.M. When water is below the 144.5 metre (m) level, shallow areas become unswimmable. The longer that water is left at this elevation, the more significant the problem in terms of lost recreational opportunities."

Response:

- The Stewartville GS forebay is restricted to 0.3 m operating range during low flow periods of the summer tourist season, to reduce the range of water levels and improve recreational opportunities. OPG

requires operating flexibility on the Stewartville forebay to effectively manage the generating stations on the Madawaska River and the power system. Further restrictions will increase the use of spill gates at Calabogie GS, causing more fluctuation at that location.

Action:

1. OPG will provide information on operating patterns for Stewartville GS so users can take advantage of expected range of water levels. The information will be available by means of a 1-800 phone number and OPG's Internet web site.

2.6.2 Water Levels Adversely Affecting Boating and Shoreline Activities

2.6.2.1 Docks and Shoreline Structures

Issue Description: " When water level at the Stewartville GS forebay are reduced to approximately 144.0 m, docks and boating activities are adversely affected."

Response:

- Operation of the Stewartville forebay has been changed to reflect supply conditions in the watershed during the summer tourist season.
- If the supply of water as measured into Mountain Chute GS is less than 53.6 cms, then the Stewartville forebay is limited to 144.48-144.78 m (0.3 m) .
- If the supply of water as measured into Mountain Chute GS is greater than 53.6 cms, the Stewartville forebay is limited to 144.0-144.78 m (0.78 m).
- If the 0.78 m range is in use, Calabogie GS is to be scheduled to ensure the Stewartville forebay level rebuilds and is not left at the lower part of the operating range for an extended period of time.

Action

1. Alternative dock systems (eg floating, cantilevered), as opposed to fixed dock systems, are recommended to help deal with water level fluctuating problems.
2. Refer to section 2.3.9.

2.6.2.2 Boating Safety

Issue Description: " When water is released at Calabogie GS, the higher level of this section of the river creates a strong current, leaving canoes and boats caught downstream, unable to return to their point(s) of origin."

Response:

- Alarms have been suggested to notify users of flow changes. OPG does not use active alarm system because of potential failure and associated liability issues.

Figure 12
Stewartville GS and Upstream

Stewartville GS Upstream/Springtown Marsh

Stewartville GS

Action:

1. Signs will be put at additional access points to the river to ensure users are aware of potential water level fluctuations. The PAC will identify sites.

2. Calabogie GS spill gates operate in an open or closed position. Gate operation will be reviewed to determine if partial operation is possible.

2.6.3 Privatizing OPG and Future Water Level Regulation

Issue Description: "In light of the real possibility the generating arm of Ontario Power Generation may be privatized, it is of concern that 50 year old regulations, allowing water level fluctuations of up to 2 meters (7 feet), would be detrimental to the Stewartville Reach of the river. Consequently, urgent attention needs to be given to updating the regulations to 0.6 m (24 inches) in the winter, and 0.3 m (12 inches) in the summer, in order to reflect current ecological, social and environmental considerations."

Response:

- The issue of privatization of OPG assets is discussed in the generic issues section 2.3.6, because it is an issue that potentially impacts all reaches of the river.

- OPG has changed the operating directive for Stewartville forebay during the summer period that is a function of supply conditions. The forebay is limited to a 0.3 m range in dry conditions and 0.78 m under wetter conditions.

- Stewartville GS water level fluctuations normally do not exceed 1 m outside of the summer period. A lower operating limit of 143.50 m outside the summer period but with potential excursions below it during energy shortages would resolve most concerns.

Action:

1. OPG to follow up with a directive voluntarily limiting the bottom of the operating range to 143.50 m from Thanksgiving weekend to April 1.

2. Refer to Generic section 2.3.6.

2.6.4 Shoreline Erosion

Issue Description: "A short section of shoreline with clayey soils approximately 100 m east of the bridge at Burnstown is steep and eroding badly. The eroded material reduces water clarity and contributes to floating debris. Other nearby sites are exhibiting erosion problems as well, including a section of shoreline approximately 100 yds. west of the Ministry of Transportation (MTO) picnic area (Cherry Beach) along County Road 508."

Response:

- Erosion issues that are affected by the operation of OPG's generating stations are to be referred to the OPG's EWG for resolution.

- Erosion in this reach of the river may potentially damage banks and shoreline structure, but has little

effect on water clarity and does not pose a threat to fish habitat.

Action:

1. Refer the erosion issue to the EWG.

2. Refer to section 2.3.3.

2.6.5 Minimum Flow Requirements for Walleye Spawning in North Channel of River Calabogie GS

Issue Description: "During spring freshet, water may be spilled down the North Channel to facilitate walleye spawning. In some years, flows have been sufficient to attract spawning fish, and then these flows have been dropped prior to the eggs incubating and hatching. Flows have been minimized in some years to prevent spawning from occurring in the channel. Attempts are being made by MNR and OPG to assess the minimum flows required to cover the spawning substrate. High flows during spring freshet cover sections of river bed that are not suitable for spawning."

Response:

- During high flow periods like spring freshet, OPG needs to be able to spill water through the North Channel to maintain water control in the river system. OPG prefers to spill water in the North Channel because spill in the South Channel reduces the capacity of the three automated sluice gates and the generating station.

- MNR and OPG have performed a series of flow tests in 1996-98 and have developed a strategy for managing flow in the North Channel:

- OPG can spill as needed prior to spawning,

- Reduce the flow to 15 cms during the spawning and incubation period.

- If inflows in the river drop to less than Calabogie plant capacity (approximately 70 cms), reduce the North Channel to 5 cms during incubation.

- Spill more water later if required.

Action:

1. Inform local interested parties of water management for walleye spawning in the North Channel (Calabogie Fish and Game Club, Walleye Watch participants).

2. South Channel spawning shoals are to be assessed for usefulness and spawning success (see Information Needs Document).

3. Determine if there is a backwater effect from Stewartville on the South Channel. The spawning shoal has to be below the minimum water level from backwater effect.

4. OPG will write an operating procedure for North Channel water management. A report of 1998 test results complete with photographs will be issued (Mar/99).

2.6.6 Effects of Low Flows in the North Channel of the River at Calabogie GS on Boating

Issue Description: The North Channel cannot be used for kayaking and canoeing when flows there are reduced to the summer minimum of 0.85 m^3/s. This loss of opportunity has an potential economic impact."

Response:

- An individual has requested 15 cms flow during the summer for kayaking and canoeing. Flow tests conducted in the spring of 1996 by OPG indicated that 15 cms would provide a short stretch of rapids at the extreme upper end of the rapids below the control structure, and would be suitable for kayaking, but that it would not be navigable for most canoeists.

- Providing sufficient flows for kayaking and canoeing is economically prohibitive for OPG when the cost of additional log operations and lost energy from the Calabogie GS are considered. There is no demonstrated economic activity related to boating on the North Channel at the present time.

- The potential exists for coordinating spring recreational opportunities with the proposed spawning mitigation strategy described in previous section.

Action:

1. Should an economically viable proposal be advanced, OPG would consider it.

2. Refer to section 2.3.3.

2.6.7 Limiting Factors to Production of Walleye, Pike, Muskellunge etc.

Issue Description: "Large water level fluctuations during the spring spawning period adversely impact fish populations in some reaches (i.e. - Springtown Marsh, Cherry Beach)."

Response:

- OPG has taken action to protect pike and muskie spawning conditions by putting a new lower limit of 144.0 m on the Stewartville GS forebay beginning April 1 of each year. The operating restriction remains in place until the summer level restriction comes into force on the May long weekend. By this time, spawning has occurred. Moderate water level fluctuations are not a threat.

Action:

1. Spring surveys will be conducted of fish spawning habitat at Springtown Marsh and Cherry Beach Rapids. The survey will be used to identify limiting factors to successful reproduction in these areas when spring river flows permit (see Information Needs section).

2.7.0 Calabogie GS to Barrett Chute GS, Including Calabogie Lake - Reach 4

2..7.1 Effects of Water Level Management in Calabogie Lake on Riparians and Boaters

Issue Description: "High water levels in Calabogie Lake contribute to flooding, ice damage and erosion of the lake's shoreline. Low water levels adversely affect boating activities."

Response:

- The top of the Calabogie Lake operating level was lowered by 7 cm to 154.10m to address some of the concerns. Erosion is affected by many factors including water level, wave and wind action along with ice movement during breakup.

- Water levels on Calabogie Lake are regulated within the operating band, 153.8-154.10m (0.30m), through the summer period, to accommodate boating and other recreational concerns.

Action:

1. Refer to sections 2.3.3 & 2.6.4.

2.7.2 Poor Walleye Fishing in Calabogie Lake

Issue Description: "Local residents report that walleye catches have declined in recent years. A creel survey in 1994 and recent electrofishing surveys in 1995 and 1997 conducted by MNR suggest that there may be limited or no recruitment of young walleye to the sport fishery."

Response:

- MNR stocked Calabogie Lake with juvenile walleye from shortly after the construction of the Barrett Chute GS in 1968 to 1990.

- A 1998 spring trap net survey conducted by MNR as part of this review suggests that there is still a recruitment problem. Aging of samples shows that there are few young fish in the lake, but large numbers of older, mature fish indicate that the reproductive potential still exists if spawning habitat is enhanced and protected.

- The Calabogie Fish and Game Club has initiated rehabilitative stocking of young walleye with some financial help from OPG. The Club has also completed a CFWIP project to improve walleye spawning habitat at the mouth of Constant Creek with help from MNR.

Action:

1. Regulation of the walleye fishery is being considered by MNR and the local community. Changes will require public input.

2. MNR is conducting a study to correlate walleye recruitment and reproduction to the sport fishery with spring water levels/flows (see information needs).

2.7.3 Walleye Spawning at Barrett Chute GS

Issue Description: "Although the Barrett Chute GS tailwater appears to be used by walleye for spawning, reproduction does not appear to be sufficient to maintain a walleye fishery equivalent to that prior to expansion of the station in 1968 without supplemental stocking. Spawning or egg incubation may be negatively affected by peaking flows or water level fluctuations. Water temperatures may be too low because the station draws deep water from the upstream headpond."

Figure 13
Calabogie GS and Upstream

Calabogie GS

Calabogie GS forebay - Grassy Bay

Response:

- The tailwater area is presently used for spawning by the Calabogie Lake walleye stock, and is believed to be potentially the most important spawning site for Calabogie Lake. Walleye have been observed aggregating over shallow habitat in the spring on both sides of the channel upstream of the boom. Eggs have also been observed after spawning. However, the available shallow spawning habitat is somewhat limited by the channel improvements that were undertaken prior to 1968 during the construction of both stations. These channels are 4m deep downstream of the old station and 10m deep downstream of the new station.

- Flow and water level fluctuations are now controlled during walleye spawning and incubation to promote walleye spawning and protect the eggs.

- The present spawning area is small. There may be potential to expand the area of suitable habitat in the Barrett Chute GS tailwater. Any new habitat will be constructed below the 153.80m minimum spring elevation of Calabogie Lake so that eggs will be protected from water level fluctuations by the backwater effect from the lake.

- Local residents have reported cooling of water temperatures in the Barrett Chute tailwater during station operation, and temperature recorders established in the tailwater in 1998 confirm this phenomenon. We believe that this phenomenon is the result of the daily warming of surface waters on hot sunny days in the spring. In May, when the station is not operating, surface water temperatures in the tailwater (and any other standing water) can rise and fall as much as 4 degrees Celsius over the course of a day. However, when the station begins operation, water is drawn from the Barrett Chute headpond from a depth interval ranging from the surface to about 16 m. The mixing of the surface and deep water of the headpond lowers the temperature of the tailwater back to the mean daily temperature. This phenomenon was clearly evident in the tailwater on May 9, 1998.

- The small variations in daily temperature occur when the station is operating in peak mode. This is most prominent on days with warm, sunny weather. The effect of these variations in water temperature on walleye recruitment is unknown. This effect typically occurs during walleye egg incubation and will only be noticeable in years when the peaking operation begins in early May and the spring weather is sunny and warm. During years when spring flows have high volumes well into May, this effect will not be noticeable due to more constant flow of water going through the station.

Action:

1. Flow tests and observations have been made at Barrett Chute since 1996. To promote spawning success, during low freshet years, OPG will operate one small Barrett Chute unit (58 cms) from 21:00 hr. to 24:00 hr. to provide current for spawning. During moderate freshet years, OPG will operate one small (58 cms) and 1 large (170 cms) unit from 21:00 hr. to 24:00 hr. (During high flow years the station will operate 24 hr. /d).

2. Calabogie Lake water levels are maintained during the spawning and incubation period for ecological and fish management (Grassy Bay, Constant Creek, Barrett Chute). The operating range is restricted to 153.80 m - 154.05 m to encourage the walleye to spawn at a lower level and avoid exposing eggs later after freshet. Once the spawning is over, the level can be raised but not lowered until the incubation period is over.

3. MNR will study year class strength of the walleye stock relative to annual station operation.

4. The feasibility of providing additional spawning habitat in the Barrett Chute tailwater will be investigated. The depth of Barrett Chute GS tail water was mapped in September 1998 to identify potential areas. OPG and MNR will participate in the spawning shoal project along with other partners.

5. OPG and MNR will continue to monitor water temperature at Barrett Chute until the phenomenon is fully understood.

2.7.4 Spills at High Falls for Walleye Spawning

Issue Description: "OPG should provide spills at Barrett Chute Spillway (High Falls) during the walleye spawning period. This is the original natural spawning channel. Walleye reproduction in Calabogie Lake was excellent until the Barrett Chute GS was expanded in 1968."

Response:

- The capacity of the Barrett Chute GS to discharge water was significantly increased in 1968. OPG has spilled over High Falls only for a few days on rare occasions to manage water since the expansion of the station. The station can pass freshet flows in almost all cases. Spilling water in the High Falls channel for the walleye spawning and egg incubation of about 6 weeks has an associated cost to OPG because it could have generated power. The estimated cost of spilling 20 cms for walleye spawning and incubation is in the order of $ 200,000 annually. This is considered too expensive and alternatives such as building additional habitat in the Barrett Chute tailwater are being assessed.

Action:

1. Building additional habitat in the Barrett Chute tailwater is being investigated (refer to section 2. 7.3, Action item #4).

2.7.5 Swimmer's Itch in Calabogie Lake

Issue Description: "Swimmer's itch is caused by a parasite that cycles through aquatic birds and snails. Periodically, swimmers and waders, often children, are infected after swimming in Calabogie Lake. Water level fluctuations in Calabogie Lake are suspected of affecting the distribution of snails and infestation of the shallow beach areas."

Response:

- The Renfrew County and District Health Unit is unaware of a link between swimmer's itch and hydroelectric operations. The problem occurs periodically in lakes throughout the Ottawa region and elsewhere across North America, whether associated with hydroelectric operations or not. The problem is caused by cercaria, rninute fork-tailed, colourless, free-swimming animals that emerge from the snail phase of the life cycle. Cercariae penetrate the skin as it dries after swimming. Since man is an unsuitable host, they die soon after. Cercariae emerge in greatest numbers during the warmest weather when most bathing is done and are often concentrated in shallow shoreline waters when inshore winds are prevalent. The high incidence of 'swimmers itch' in the lakes and rivers of the upper Ottawa Valley can be explained by the abundance of certain snail species which prefer the sandy lake bottoms characteristic of the area. Information on swimmer's itch has been prepared by the Renfrew County and District, the Ministry of Environment and University of Guelph, and can be obtained from the Renfrew County and District Health Unit in Pembroke.

Action:

1. No action is planned.

2.7.6 Calabogie Lake Water Quality

Issue Description: "Cessation of flows from Barrett Chute into Calabogie Lake during the off-peak period causes rising water levels, stagnation and a short-term decline in potable water quality."

Response:

- Hydroelectric water management at Barrett Chute will not affect potable water quality in Calabogie Lake. As a mainstem lake (situated within the river), Calabogie Lake will have a higher natural flushing rate (ratio of flow to volume) than most lakes in the region. During the summer, about the same amount of water will flow into and out of Calabogie Lake on a daily basis as would occur under natural conditions. However, when summer flows are very low, the daily flow into the lake through Barrett Chute may occur over as little as an hour. Nevertheless, flow out of the lake from the smaller Calabogie GS will likely occur over a more prolonged period, and the hourly variations in inflow and outflow that occur will not affect summer stagnation or water quality in a lake this large. In the winter, more water flows through Calabogie Lake during freeze-up than would naturally occur because of the use of storage from Bark and Centennial Lakes.

- Water levels will rise and fall daily within a depth band as great as 30 cm from peaking operation at Barrett Chute GS. When elevations reach the upper limit of 154.10 m, some debris along the shorelines may be re-suspended, increasing the floating detritus in the lake.

Action:

1. No action is planned

2.8.0 Barrett Chute GS to Mountain Chute GS - Reach 5

2.8.1 Effect of Mountain Chute Operations on Water Level Fluctuations and Walleye Spawning

Issue Description: "Concerns have been expressed about the effect of Mountain Chute GS operations and resulting water level fluctuations on walleye spawning in the spring."

Response:

- This issue was originally studied by MNR in 1992 with the help of consultants (Tarandus 1992). Walleye spawn downstream of the Mountain Chute GS in the spring. Based on the consultants report, OPG has provided a minimum of 100 cms from 9:00 PM to 12:00 midnight to provide flow and current for walleye spawning in late April and early May since 1992,. This flow provides good coverage across the tailwater channel. Water elevations are maintained within a suitable range to protect the

Figure 14
Barrett Chute GS and Forebay

Barrett Chute GS Forebay

Barrett Chute GS

spawning beds by the backwater effect from the Barrett Chute forebay.

- The Arnprior Fish and Game Club improved the spawning shoals in the Mountain Chute tailrace in 1995/1996 with help from MNR.

- Barrett Chute GS is operated during the spawning/incubation period to keep the forebay between 200.7-201.17 m to ensure the spawning shoal remains covered.

Action:

1. The spawning shoal will be monitored through the Walleye Watch.

2.9.0 Mountain Chute GS to Griffith, Including Black Donald and Centennial Lakes - Reach 6

2.9.1 Effect of daily and weekly water level fluctuations during the recreation season

Issue Description: "Low water levels during the summer leave boat-lifts and ramps inoperable."

Response:

- OPG has operating restrictions in place to voluntarily limit the lower level at 248.0 providing a 0.40m range effectively during July and August summer period in response to public requests. The level can be drawn lower if there are energy and capacity shortages on the power grid. The normal summer minimum from May long weekend to Thanksgiving weekend is 247.80 m.

Action:

1. No further action because the above response has addressed the concern.

2.9.2 Effect of Fall High Water Levels at Freeze-up on Riparian Landowners and Shorelines

Issue Description: "High water levels during freeze-up cause shoreline erosion problems."

Response:

- Centennial Lake was briefly lowered to 247.80 m (the lower summer operating limit) during freeze-up. The level was then raised and the forebay operated in the normal operating range as needed by OPG for the balance of the winter. Initial indications are this action was beneficial to the shoreline.

Action:

1. Additional tests are to be conducted to verify results of this action.

2. A communique will be prepared on this issue explaining and describing a prefreshet flow strategy.

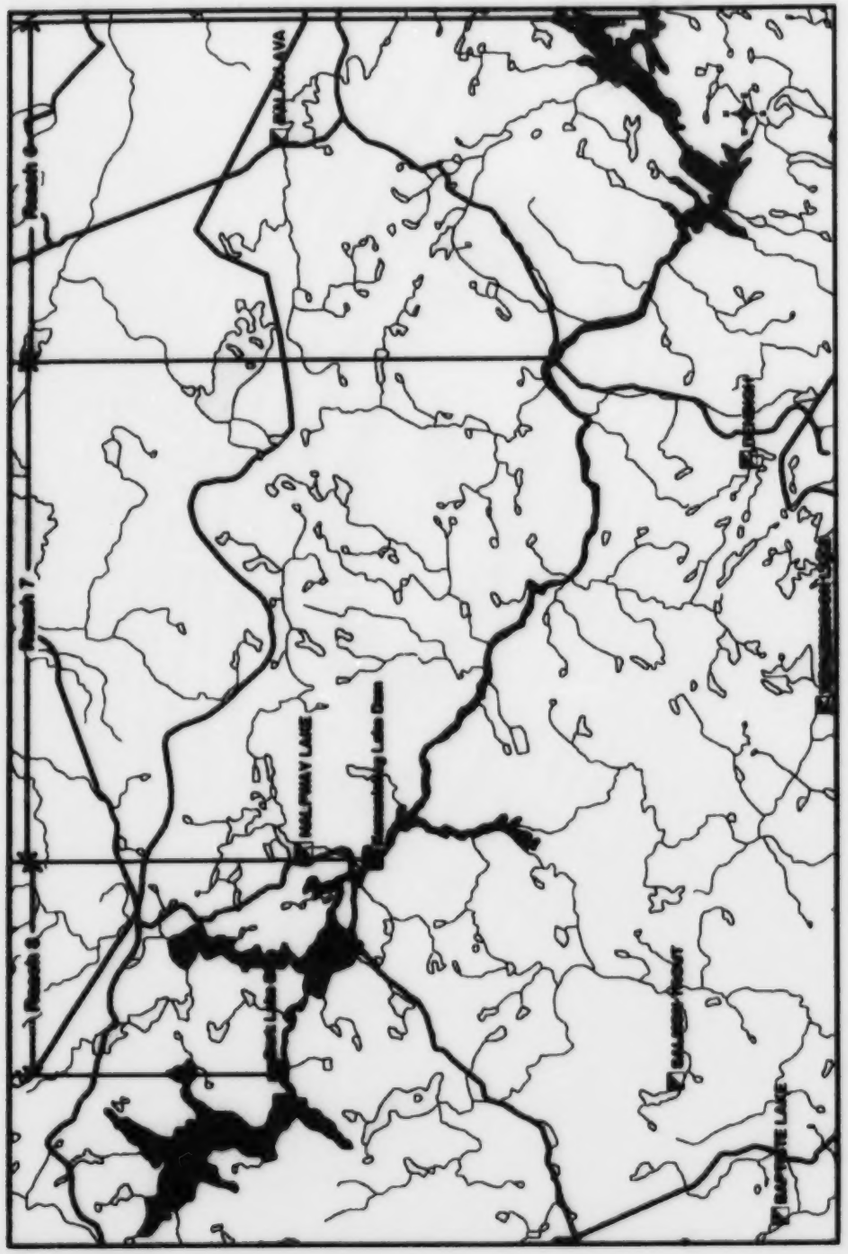


Figure 15
Reaches 6-8

Figure 16
Mountain Chute GS and Forebay

Centennial Lake (Forebay)

Mountain Chute GS

2.9.3 Dry Wells Between Camel Chute and Griffith in Early Spring

Issue Description: " When river levels between Palmer Rapids and Camel Chute are low, some residential wells in the Griffith area go dry. The problem of dry wells occurs when freshet is late and there are minimal flows in the river system because freshet drawdown at Bark Lake and Centennial Lake have been completed."

Response:

- Four wells are reported to be affected. It is believed that they are all dug wells or sand point wells. When the Mountain Chute forebay (Centennial/Black Donald Lake) is near the lower part of its drawdown, the river between Griffith and Camel Chute reverts back to its natural state before the reservoir was created. It is during that time that the dry wells have been reported.

- Flood control is a priority for OPG. Changing the reservoir operating pattern and freshet drawdown to accommodate this concern is not an option because of the importance of flood control requirements. The volume and timing of freshet cannot be forecast precisely because of weather variables. OPG already schedules the drawdown to finish as close to the start of freshet as deemed reasonable to prevent undue flooding risks.

- Installing a weir at Camel Chute to retain water in the reach may alleviate the dry well problem. The construction of a weir at this location would impede navigation and fish passage. The associated construction costs and permitting requirements combined with minimal benefits do not justify further investigation of this option.

Action:

1. The affected well owners should consider deepening their wells to solve this problem.

2. MOE will be contacted to determine the types of wells and their location.

3. The affected well owners are encouraged to consult with local well contractors to determine the best well design in order to alleviate the problem of dry wells in the spring.

2.9.4 Pike Spawning Habitat

Issue Description: "It is perceived by local anglers that the abundance of pike has declined over time. Pike spawn in shallow weedy marshes or littoral areas in the spring at ice break-up, their eggs hatch a few days later and the newly hatched fry may spend several weeks in shallow nursery areas. Water management may affect pike reproduction."

Response:

- Centennial Lake has a winter drawdown of 4.5 m. The lake may not be refilled quickly enough in the spring to allow pike access to appropriate spawning habitat. The reservoir can be filled earlier but this leads to a sacrifice of flood control during the late spring .

- During reservoir filling in the spring, brief drawdown of a few days may lead to the stranding of spawning pike or eggs. While this has occurred rarely in the past, OPG has developed an operating instruction to continue raising the level of Centennial Lake once filling has started, to avoid this problem.

Action:

1. Further study is required to identify pike spawning areas and determine the effect of water management on pike reproduction (see Information Needs Document).

2. Based on the results of the research, an action plan will be developed with OPG, MNR and local interests, and will be implemented in a timely manner.

2.9.5 Walleye Spawning Habitat and a Declining Walleye Population

Issue Description: "Centennial Lake walleye are believed to spawn in the rapids at Camel Chute or Griffith at the end of April or early May. In some years, spawning may occur before filling of Centennial Lake is completed. The rapids at Camel Chute may be flooded by the reservoir after spawning, but before the eggs hatch. There has been a steady decline in walleye being caught by anglers, size of fish and quantity of fish are reduced compared to past years."

Response:

- Flooding of Camel Chute after spawning is not believed to have a negative effect on walleye egg incubation.

- There is insufficient data available to determine the state of the walleye fishery in this reach.

- Depending on the results obtained from assessing the fishery, an action plan will be developed to improve the fishery including enhancing spawning habitat, stocking fish and protecting fish stocks through regulation.

Action:

1. Further study is required to identify walleye spawning areas in Black Donald/Centennial Lake and the effects of reservoir management on reproduction (see Information Needs Section).

2. A Walleye Watch program will be implemented in this area.

3. A Fall Walleye Index Netting (FWIN) program was conducted on Black Donald/Centennial Lake in 1998 (see Information Needs Document). Results will be available 1999.

4. An action plan for Black Donald/Centennial Lake will be developed which may include habitat enhancement, stocking and regulation of the fishery.

2.9.6 Effects of Reservoir Drawdown and Refilling on Riparian Habitats and Wetlands

Issue Description: "Centennial Lake has many associated wetlands and shallow littoral areas that have potential to provide habitat for fish, amphibians, reptiles (i.e. water snakes, turtles), aquatic mammals (muskrat) and birds. These areas are subject to a 4.5 m drawdown during the winter which may lead to the destruction of perennial species by stranding, desiccation and freezing."

Response:

- The impact of the drawdown is recognized as a potential problem. This effect is a residual impact of providing flood control and flood control is a priority.

Action:

1. More information is needed on the effect of water management on the ecology of these wetlands (see Information Needs Section).

2.9.7 Effects of Spring Flooding and Daily Summer Water Level Fluctuations on Waterfowl

Description: Birds that nest on water (i.e. loons) may begin nesting before filling of Centennial Lake is complete (about May 24). After filling of the reservoir, small fluctuations in water level of about 0.40 m still continue on a daily and weekly basis. Reservoir filling may flood nests in the early spring, and subsequent fluctuations may also affect nesting success.

Response:

- The refilling of Centennial Lake controls the water level and depends on the timing of freshet and providing flood control. Flood control protection is a priority.

- Information is required on the timing and success of waterfowl nesting in local wetlands.

Action:

1. The effects of water management on waterfowl requires review (see Information Needs Section).

2. If necessary, mitigation measures such as the provision of floating nest platforms for loons could be implemented to reduce the impact of water level fluctuations.

2.10.0 Griffith to Palmer Rapids - Reach 7

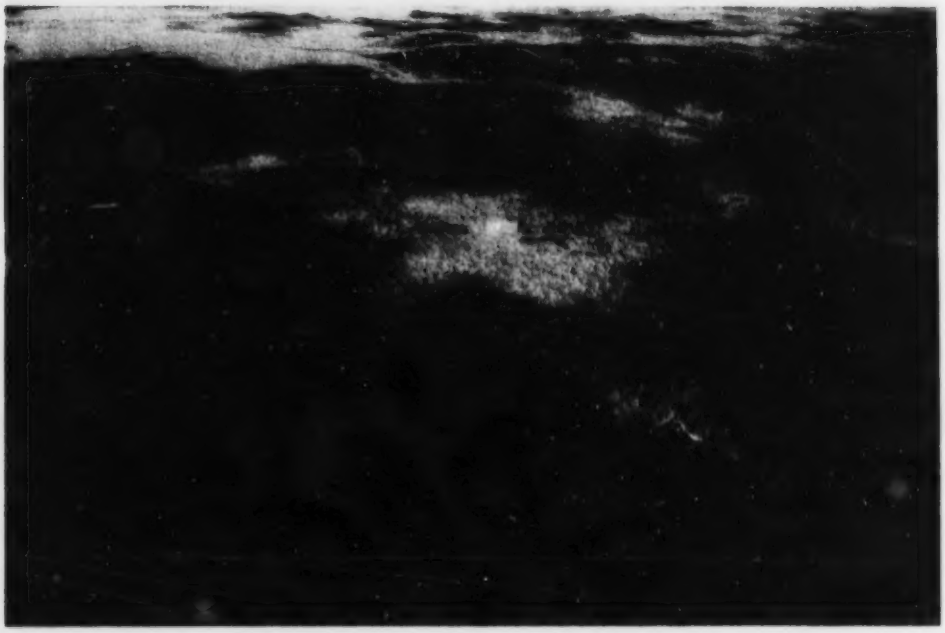
2.10.1 Exposed spawning beds

Issue Description: " Walleye spawn has been left high and dry below the Palmer Rapids Dam."

Response:

- The York River flow is relatively unregulated and provides most of the Palmer Rapids Dam flow during early freshet. As the York River flows recede and the corresponding Palmer Rapids flow drop, downstream water levels also decline like a natural river. If the walleye spawn during the peak flow period, they will likely be uncovered each year.

Figure 17
Madawaska River Between Griffith and Palmer Rapids



Madawaska River Provincial Park

Camel Chute

Action:

1. Further assess where walleye spawn in this reach and build spawning shoals where continuous coverage is ensured at all times (see Information Needs Document).

2. Local Fish and Game Club to apply for CFWIP funding to create spawning beds.

2.10.2 Water Releases for Recreational Purposes

Issue Description: "There is a need to better communicate water flow information to the whitewater paddling community, especially about flows in the Palmer Rapids to Griffith reach."

Response:

- Chenaux GS operating staff provide information to Canoe Ontario every Thursday during the paddling season. Canoe Ontario updates the expected Palmer Rapids flow on its website and 1-800 Info-Line.

- To improve communication throughout the paddling community, Madawaska Kanu Camp (MKC) will add lower and middle Madawaska River flows to the gauge page on its website. The data are updated weekly. The MKC website will be linked to OPG's Madawaska River website, which will also provide a link to Canoe Ontario's website.

Action:

1. OPG's Madawaska River website will include linkages to MKC and Canoe Ontario's website.

2.10.3 Drowning of Furbearers

Issue Description: "High flows and levels between Palmer Rapids and Griffith during the fall/winter drawdown leads to drowning of some muskrats and beavers."

Response:

- The increased flow from Bark Lake drawdown during Dec-Feb raises water levels in winter through this reach. Even if the drawdown period is extended there would still be flows of 50 - 60 cms during the winter. Bark Lake is the significant flood control reservoir on the Madawaska River. Reducing the drawdown and flood storage in Bark Lake would reduce the flows in this reach but at a cost of increased downstream flooding potential in the spring. Increasing the flood potential was not an acceptable alternative.

- The Bark Lake water management regime changed in late 1960's. There was usually a summer drawdown for power requirements so less flow was needed during the winter to empty it. The construction of Mountain Chute (1967) increased the capacity of OPG facilities to pass water during the winter, eliminating the need for a summer drawdown.

- Trappers could be encouraged to trap animals as soon as possible after the start of the season.

- MNR is preparing a report on the current status of furbearers. Additional information must be gathered to make informed decisions. Crown trapline operators and private trappers must be consulted.

Action:

1. MNR will provide a furbearer status report.

2.10.4 Information on Walleye Downstream from Palmer Rapids to Griffith

Issue Description: "Concerns exist regarding fish populations from Palmer Rapids to Griffith. Information on these populations is limited."

Response:

- The fish populations in this section of the river are very difficult to assess due to the riverine nature of this reach.
- There is insufficient data available to determine the status of fish populations in this reach. "Walleye Watch" observes spawning activity at Palmer Rapids.

Action:

1. Studies are required to assess the fish community and populations and the angling effort for this reach. (See Information Needs Section)

2.10.5 Availability of Water Below Kamaniskeg Lake for Recreation (canoeing, kayaking, Rafting, etc.).

Issue Description: "What is the feasibility of operating Kamaniskeg Lake dam to allow great flow over weekends? More water could be released at Palmer Rapid in weekends in July and August (eight weeks a year when available)."

Response:

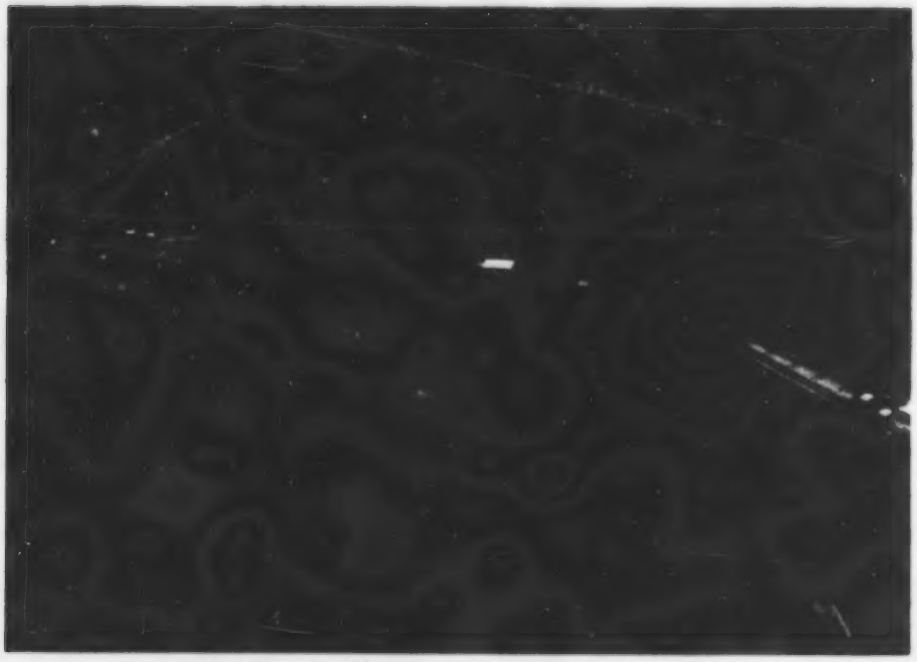
- There is a need to balance flow requirements with generation needs and impacts elsewhere on the river. This may not be achievable.
- There may be substantial additional costs to OPG, which would have to pass these on to the users.

Action:

1. Proponents to develop a proposal addressing the need to establish additional water flow for week-ends.
2. OPG, MNR and proponents to meet in the fall of 1999 to review and discuss the proposal.

Figure 18
Palmer Rapids Dams

Palmer Rapids



Palmer Rapids (Kamaniskeg Lake) Control Structures

2.11.0 Palmer Rapids Dam to Bark Lake Dam, including Kamaniskeg and Negeek Lakes and Conroy's Marsh - Reach 8

2.11.1 Flow requirements for recreational uses

Issue Description: "The perception is that Madawaska Kanu Camp receives additional flow releases from Bark Lake to operate its whitewater program at expense of Bark Lake users."

Response:

- MKC has received mid-week flow releases from Bark Lake from May to September to support its whitewater operations since 1969. In most years, providing the flow releases through the week for MKC has no impact on maintaining Bark Lake in the summer operating range. Under normal conditions, MKC does not receive additional water at the expense of Bark Lake.

- MKC and the associated tourist industry cannot operate without periodic daytime midweek releases.

- A compromise has been proposed for Bark Lake flow releases from May to September that balances upstream and downstream users during dry conditions. The scenario is as follows and is subject to further refinement and discussion:

    1. MKC receives the 26 hrs of midweek water dispatch (25.6 cms) until Bark Lake reaches 313.62 m.

    2. MKC midweek water reduced from 26 hr/week to 18 hr/week.

    3. When Bark Lake reaches 313.50 m, Bark Lake discharge will be reduced. The amount and timing of flow releases will be negotiated and depend on inflow conditions, time of year and impact.

- Bark Lake minimum discharge is approximately 3 cms. This is an MNR fisheries requirement and must be passed. If the inflow into Bark Lake is less than 3 cms during a drought, the lake level will decline even without whitewater releases.

- The MOE minimum flow at the Amprior GS is approximately 10 cms for pollution dilution requirements. Under most cases, local inflow from Kamaniskeg Lake to Amprior GS, combined with the approximately 3 cms from Bark Lake is enough to provide for the Amprior minimum. Additional water from Bark Lake to support the Amprior minimum over and above the approximately 3 cms may be required, thereby potentially reducing Bark Lake levels below 313.50 m during dry periods.

Action:

1. OPG will write procedure for operating Bark Lake during dry conditions.

2.11.2 Effect of Water Level Fluctuations on Residents and Commercial Tourist Operators

Issue Description: "High elevations cause shoreline erosion and low elevations create problems for launching boats. Water level fluctuations in winter can cause ice damage to docks."

Response:

- Specific erosion complaints can be processed through OPG's Erosion Working Group. Erosion is natural occurrence on sandy shores. Kamaniskeg Lake's water level fluctuations are relatively narrow (+/- 0.30 m) throughout most of the year and mitigate erosion.

- OPG currently manages Kamaniskeg Lake in a narrow band through the summer tourist season to enhance recreational opportunities. The summer operating range is 282.94 - 283.06 m.

- Excessive boat speed and associated wakes are a problem and contribute to erosion. The Federation of Ontario Cottagers' Associations has posted warning signs limiting boat speed to 10 km/hr. within 30 m of the shoreline. (In 1992, Ontario's Boating Regulations were amended to establish a new shoreline speed zone that requires all power-driven vessels to operate at 10 km/hr. or less within 30 m of a shore. The restriction does not apply in areas previously posted with a shoreline speed limit; in buoyed channels and canals; on rivers or sections of rivers that are less than 100 meters in width; and to vessels towing a person on water skis, a surf board or any such equipment provided the vessel follows a trajectory that is perpendicular to the shore, or the vessel is operated within an area designated by buoys as an area in which such operation is permitted.)

Action:

1. Removable, floating dock systems are recommended to avoid ice damage associated with fixed docks.

2. Refer to sections 2.3.3 & 2.3.9.

2.11.3 Narrow Operating Limits (+/- 6 cm) on Kamaniskeg Lake in the Summer

Issue Description: "In response to requests from year-round and seasonal residents of Kamaniskeg Lake, the water level on the lake is maintained within a narrow range of 282.94 m - 283.06 m during the summer period. OPG would like to increase the range to 282.88 - 283.06 m to provide staffing flexibility."

Response:

- The operating range increase is not expected to have a negative impact on tourist operations or recreation. The additional 6 cm of summer operating range will allow OPG to reduce the number of log operations and associated costs. Log operations during freshet will be done as required, and daily if necessary.

Action:

1. The summer operating range will be increased to 282.88 - 283.06 m. OPG will write required changes to the Kamaniskeg Lake operating procedures.

2.11.4 High water Level Elevations Below Bark Lake Dam During Fall/Winter Drawdown

Issue Description: "During the fall/winter drawdown of Bark Lake, water levels in Kamaniskeg Lake are increased to high levels due to a "bottleneck" in the outflow at Palmer Rapids."

Response:

- The Palmer Rapids dam is a bottleneck during extremely high flows that require the level of Kamaniskeg Lake to rise in order to increase the discharge capacity of the dam. Flows that cause this situation historically occur in the spring during freshet. The additional water from the fall/winter drawdown of Bark Lake combined with local inflow to Kamaniskeg Lake is not enough to cause Palmer Rapids dam to be a bottleneck and raise the lake level during this time period.
- Channel improvements at Palmer Rapids dam have increased the capacity of the dam to pass flow reducing flooding potential on Kamaniskeg Lake year round.

Action:

1. No action is planned.

2.11.5 Augmented Late-Winter/Spring Flows on Kamaniskeg Lake

Issue Description: "The local inflow and discharge data to Kamaniskeg Lake during the winter have a peaking shape. The distribution of flows out of Kamaniskeg Lake may be attributable to the water management of Baptiste Lake."

Response:

- OPG's historic records of inflow to Kamaniskeg Lake spike during January and increase the Palmer Rapids flow.

Action:

1. The Kamaniskeg Lake and York River data will be reviewed to confirm the values. MNR data for Baptiste Lake will be correlated.

2. The water management of Baptiste Lake will be reviewed to determine if the impact on Kamaniskeg Lake can be modified.

2.11.6 Effect of Water Level Regulation on Productivity of Aquatic Species and Furbearers at Conroy's Marsh

Issue Description: "Kamaniskeg Lake water levels are managed during the summer for recreation and tourism within a narrower range (283.0 m +/-6 cm) than would occur naturally. The level of Kamaniskeg Lake controls the level of Conroy's Marsh. The question is whether this is having an adverse effect on the productivity of the marsh. It appears that duck and amphibian populations are not as abundant as they might otherwise be."

Response:

- A four-month summer drawdown of 1 m or more would be beneficial for the marsh ecology, birds, fish, furbearers, etc. but would impact recreational use of Kamaniskeg Lake. A change in operation will require public consultation.

Action:

1. MNR contacted Ducks Unlimited in 1998 to assess the condition of the marsh and provide recommendations for rehabilitation if necessary. Ducks Unlimited will submit a report in 1999.

2.11.7 Effect of Winter Drawdown on Muskrat in Conroy's Marsh

Issue Description: "The drawdown on Conroy's Marsh has been limited during freeze-up so that muskrat are not trapped in their lodges by the collapsing ice."

Response:

- OPG currently limits the winter water level fluctuation on Kamaniskeg Lake to limit the impact on muskrats. The lake is usually lowered to 282.85 cm before ice has formed and then operated within a +/- 6 cm band. This method of operating has been in place for several decades and its effectiveness has not been measured.

Action:

1. Review the status of the muskrat population and assess whether the winter operating practice has value for the health of the overall marsh ecology. MNR is currently preparing a furbearer report to help answer some questions.

2.11.8 Erosion at Bells Rapids

Issue Description: "A concern was expressed about erosion occurring at Bell's Rapids where the river has been diverted. The river channel has been changed by natural erosion processes. Fallen timber has created a safety hazard for kayakers at the diversion."

Response:

- Erosion at Bells Rapids where the river was diverted is being addressed. A work permit has been issued by MNR to MKC to make the necessary repairs in the fall of 1998. DFO has given approval.

Action:

1. MKC will undertake the remedial work under the work permit and DFO approval.

2.11.9 Information on Negeek Lake

Issue Description: "Information on the limnology and morphology of Negeek Lake and its fish populations, is not available."

Response:

- OPG has hired a consultant to do a lake survey possibly in the fall of 1998. Details are outlined in the Information Needs section.

Figure 19
Conroy Marsh and Kayaking

Conroy Marsh

Kayaking Downstream of Bark Lake

Action:

1. Field work is complete and the report will be available in the first quarter of 1999.

2.11.10 Impact of Flows out of Bark Lake

Issue Description: "A concern exists that sufficient water is released from Bark Lake in the spring to cover the Bell's Rapids spawning area."

Response:

- Flow tests of 6 cms, 15 cms and 25 cms were conducted in the fall of 1997 to measure spawning bed coverage at various flows. Observations of 50 cms flow were also made in May 1997. The back-water effect from Kamaniskeg Lake was observed to cover most of the spawning bed at the base of the rapids regardless of the river flow. There was no appreciable difference in coverage within the rapids between the 25 cms and the 50 cms flow scenarios. The 15 cms flow also provided good spawning conditions although some suitable spawning substrates are exposed when flows are reduced from 25 to 15 cms.

- The following is the operating strategy for Bark Lake discharge during the walleye spawning/incubation period as a result of the flow tests :

    1. Pass 15 cms from Bark Lake during the peak spawning period to keep walleye in the centre of the river channel.

    2. Maintain 15 cms during the incubation period if water supplies permit.

    3. During a dry freshet, reduce Bark Lake discharge to 5 cms after spawning is completed if needed to refill Bark Lake to the summer minimum target level .

    4. During a wet freshet, increase Bark Lake discharge for level control if needed. If 25 cms or more water is passed during spawning, 25 cms becomes the minimum flow required during the entire incubation period.

Action:

1. OPG will issue an operating procedure describing the water management guideline for walleye spawning in Bells Rapids. A report outlining results will be co-authored by MNR.

2. Completion of proposed channel remediation by the Madawaska Kanu Camp will increase flows at the Bells Rapids spawning site. OPG will conduct additional flow tests (10 cms) to refine the operating strategy when the work is completed. Less water may be needed for the same spawning shoal coverage.

2.12.0 Bark Lake Dam to Headwaters - Reach 9

2.12.1 Bark Lake Dam Flows

Issue Description: "There are concerns about the impact of outflows from Bark Lake to cover fish spawning areas at Bells Rapids on summer target elevations on Bark Lake."

Response:

- In the spring of 1997, Bark Lake was lowered to provide water to cover the Bells Rapids spawning bed during the walleye egg incubation period. Bark Lake did not recover to the summer minimum until the end of August 1997 because of extremely dry conditions in the watershed. This hampered recreation and tourism on Bark Lake. In this instance, protection of fish habitat receives priority over recreational and tourism needs because of the legal protection provided for fish habitat under the federal Fisheries Act.

Action:

1. Refer to section 2.11.10.

2.12.2 Effect of Water Level Fluctuations on Riparians

Issue Description: "There is a need to find balance between flows required for operation of MKC, flows for walleye spawning, and maintaining elevations for riparians and boaters in Bark Lake."

Response:

- Protection of fish habitat has priority over recreation.
- Floating dock systems are recommended to reduce problems associated with fluctuating water levels.
- The walleye spawning flow strategy is outlined in section 2.11.10 explains the impact on Bark Lake water levels.
- The compromise between downstream users and Bark Lake users is detailed in section 2.11.1.

Action:

1. See "Action" statements in sections 2.11.1 and 2.11.2.

2.12.3 Flooding at Madawaska Village when Bark Lake is at its Maximum Elevation

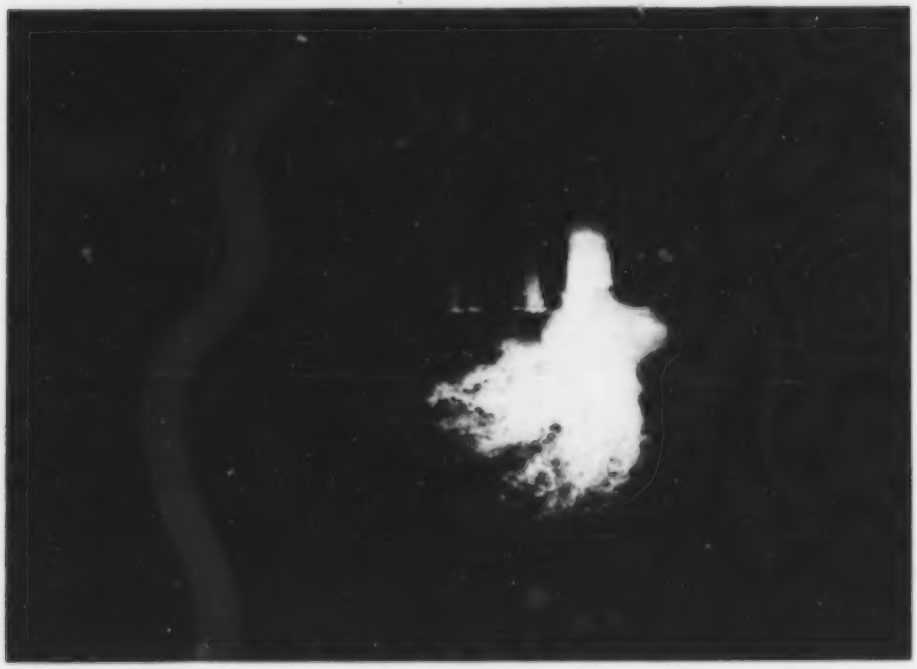
Issue Description: "Basements in the Village of Madawaska can flood when Bark Lake is held at its maximum elevation."

Response:

- The Licence of Occupation provides flooding rights for OPG on Bark Lake to 313.94m. OPG limits the level to rise to 313.90m which appears to control basement flooding in the village.

Figure 20
Bark Lake and Upstream

Bark Lake - 1999



Bark Lake Dam

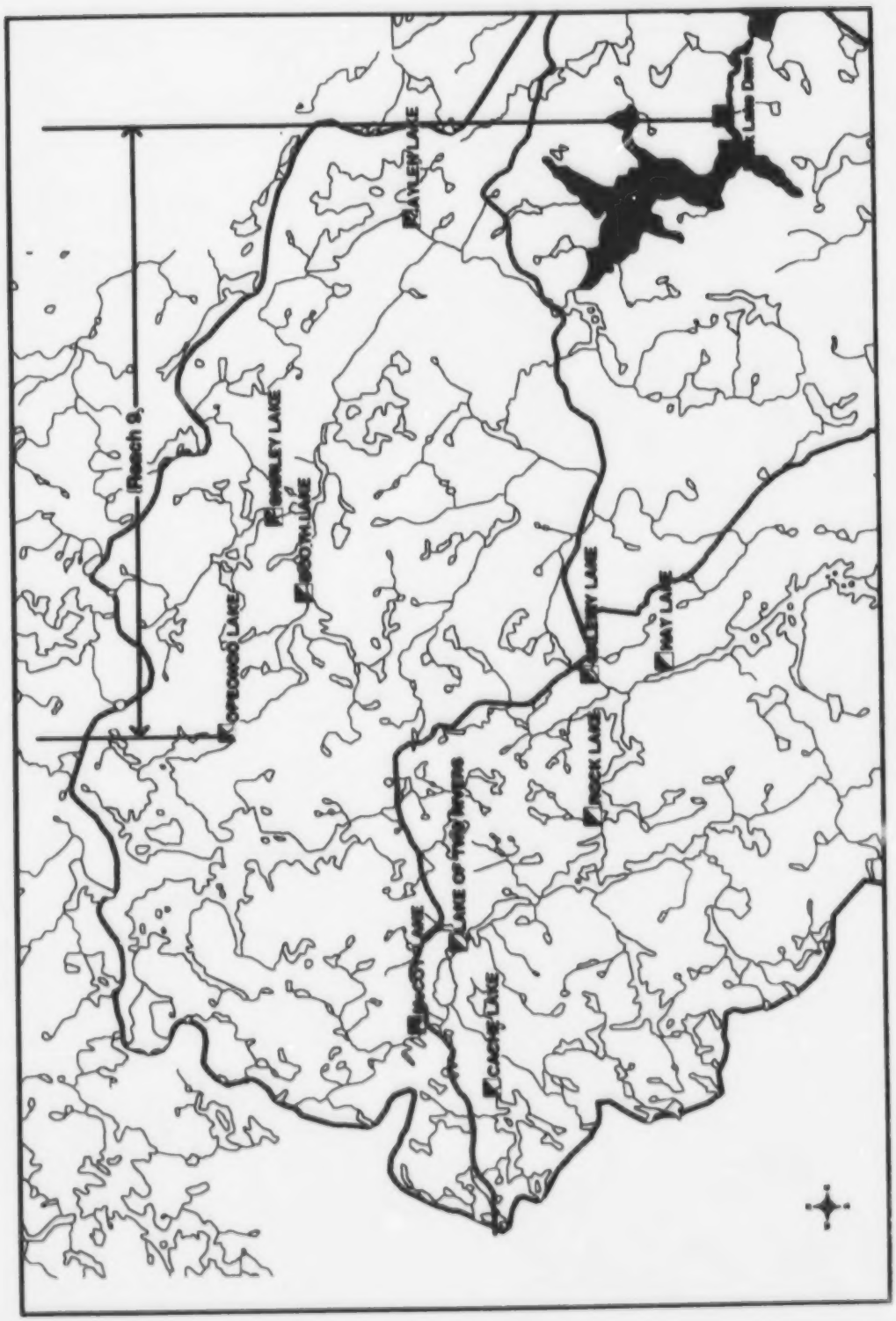


Figure 21
Reach 9 - Upstream

- The amount of storage above 313.90 m is insignificant for flood control and does not impact regulation decisions and users downstream.

Action:

1. OPG will write an operating procedure for Bark Lake, voluntarily limiting the upper range to 313.90 m to reduce potential basement flooding in the Village of Madawaska.

2. OPG will review to determine if the flows in the river section are responsible for the flooding problem or Bark Lake levels when conditions permit.

2.12.4 Bank Erosion Upstream of Bark Lake

Issue Description: "The upper Madawaska River flows through a predominantly sand valley. Conspicuous bank erosion is occurring on the river 7 km upstream of Bark Lake. There are concerns that this is aggravated by Bark Lake water level fluctuations and the wakes from power boats".

Response:

- The first set of rapids on the upper Madawaska River occurs at the Town of Madawaska (upstream end of the Breshnahan property). The rapids are exposed in the winter when Bark Lake is drawn down, but flooded in the summer when Bark Lake is full. In the winter, these rapids will act as a hydraulic control for upstream water levels. In the summer it is not yet known if the rapids or the dam are the primary control of water levels in the upper river.

- Maximum bank erosion in the upper river probably occurs during the spring flood that is not affected by OPG operations in this part of the river.

- In the summer, water levels here may be affected by those of Bark Lake, but the range of fluctuation on Bark Lake is tightly controlled by OPG around 313 m.

- Flooding of the rapids at the Town of Madawaska in May allows boaters access to the upper river during the summer. Boat wakes may aggravate erosion. Prevention of boat passage at the rapids would require a decrease in the mean summer elevation of the lake by an unknown amount, and could affect existing recreation and tourism on Bark Lake.

Action:

1. OPG will determine if water levels in the upper river are controlled by the Bark Lake Dam or by the rapids at the Town of Madawaska.

2. Private property owners are encouraged to erect signs directing boaters to operate their vessels more slowly.

2.12.5 Narrow Operating Limits (+/- 6 cm) on Bark Lake in the Summer

Issue Description: "In response to requests from year-round and seasonal residents of Bark Lake, water level elevations on the lake are maintained within a narrow range during the summer period. This presents challenges to water managers, particularly in very high and low water years, in terms of maintaining a balance among the needs of other river uses/users. OPG would like to increase the range to 313.68 -313.80 m to 313.62 -313.80 m to provide staffing flexibility."

Response:

- The additional 6 cm should not impact tourist operations and recreational opportunities on Bark Lake. OPG would like an increase in operating range for staffing flexibility. The additional 6 cm of summer operating range (313.62-313.80 m) would allow OPG to reduce the number of log operations and associated costs. Log operations during freshet will be done as required and daily if necessary to manage levels.

Action:

1. The summer operating range will be increased to 313.62-313.80 m. OPG will write the Bark Lake directive to include the revised operating range.

2.12.6 Destruction of Lake Trout Population in Bark Lake

Issue Description: "There is no longer a self-reproducing lake trout population in Bark Lake because of the 10m winter drawdown. The drawdown normally takes place from January to the end of March."

Response:

- MNR supports the Bark Lake, lake trout population with hatchery plantings.
- Research is being done on deep spawning types of lake trout that might be suitable for Bark Lake stocking.
- OPG will contribute to the cost of fish restocking programs on Bark Lake. Consideration will be given to excluding all shoals (i.e.- fencing), timing of drawdown, lowering the shoals, etc.

Action:

1. OPG agrees to contribute to the cost of stocking lake trout in Bark Lake.
2. Review deep spawning lake trout research for application to Bark Lake.

2.12.7 Quality of Fishery above Bark Lake Dam/Fisheries Assessment in Headwater Lakes and Streams

Issue Description: "There is a need for fisheries assessment work in headwater lakes and streams. Walleye were introduced into some of these water bodies recently. Productivity and spawning areas are unknown."

Response:

- MNR offices in Bancroft District and Algonquin Provincial Park have information on walleye and other fisheries in these areas.

Action:

1. MNR will make this information available on various lakes from existing databases to interested parties on request.

2.12.8 Algonquin Provincial Park Water Levels

Description: The control of water levels in Algonquin Provincial Park has a bearing on downstream flow. Concerns have been expressed by commercial operators on the Madawaska River in the park, regarding the impact/effect of any major water fluctuations on their businesses.

Response:

- MNR has indicated no major changes planned at this time. Lakes in the park operate within a narrow band and their contribution to water level management downstream outside of the freshet period is negligible.

Action:

1. MNR will review Algonquin Provincial Park water level operations.

2.12.9 Effects of Winter Drawdown on Furbearers in Bark Lake

Description: The over-winter drawdown on Bark Lake causes beaver and muskrats to abandon their lodges/houses and they are often seen walking over the ice, along the shoreline or on nearby roadways in the middle of the winter.

Response:

- It is recognized that the over-winter drawdown has an effect on species of aquatic wildlife. Beavers and muskrats would be left without water around their lodges/houses when the over-winter drawdown occurs. This would cause beavers and muskrats to abandon their homes and go looking for a new home. In the middle of winter this is not a good time and most displaced animals would fall victim to predators or the elements.

- Local trappers could be encouraged to trap animals as soon as possible after the start of the season.

- MNR is preparing a report on the current status of furbearers. Additional information must be gathered to make informed decisions. Crown trapline operators and private trappers must be consulted.

Action

1. MNR will provide a furbearer status report.

2. A fall inventory of active beaver and muskrat lodges/houses should be completed to investigate the number of animals affected and to provide a local trapper with locations for trapping. If significant numbers of animals are observed, an annual survey will be considered. The preliminary survey and report will be included in the Information Needs Document.

2.12.10 Protocol for Inter-organizational Communications and Decision Making between OPG and MNR for Water Release During Low Water and Dry Weather Periods.

Issue Description: "There is no formal process in place to ensure a coordinated approach between OPG and the MNR offices in Bancroft, Pembroke and Algonquin Provincial Park, for regulating water levels upstream from Bark Lake in the event of significant low water occurrences and extreme dry weather conditions impacting Bark Lake."

Response:

- MNR and OPG have not traditionally planned for low water level occurrences in the Bark Lake area around the Village of Madawaska, because concerns and issues generally have been related to high water levels and flooded basements.

- It is important to recognize that, in 1999, the low water levels in Bark Lake were the lowest recorded in fifty years. The entire Province of Ontario was experiencing extreme low water levels in 1999, with the Great Lakes having a thirty-two year low.

- Section 3.17 addresses the issue of developing a protocol between MNR and OPG for changing water levels relating to the spring freshet and the impact on fish spawning, but does not specifically mention low water level conditions.

Action:

1. MNR in Bancroft and Algonquin Provincial Park will add representatives to the OPG/MNR Working Group.

2. MNR in Bancroft and Algonquin Provincial Park, with assistance from Pembroke, will work together to develop a process to consult with their clients at the upper end of the watershed regarding what to expect during extreme low water level and dry periods.

3. The MNR and OPG will develop a protocol describing the process that will be followed for the release of water from MNR's dams upstream from Bark Lake, and provide contact names and telephone numbers for MNR/OPG communications during low water conditions and dry weather periods.

4. OPG will investigate the feasibility of installing a temporary gauge in the Madawaska River, upstream from Bark Lake, between the Villages of Madawaska and Whitney, so that both organizations can better monitor water flows, particularly in the spring, and to help estimate the discharge of water from upstream outflows.

5. OPG and MNR will be more vigilant in monitoring the pre-spring and spring conditions, including ground conditions (level of water table, whether or not the ground is frozen), rate of snow-melt and runoff, amount of precipitation in the snow, etc.

6. OPG will model varying drawdown patterns to determine impacts.

7. Communications between OPG, MNR and the local residents will be improved.

2.12.11 Need to Undertake a Study to Determine the Impact of the 1999 Record Low Water Levels on Fish and Wildlife in Bark Lake

Issue Description: "Bark Lake experienced its lowest recorded water levels in fifty years in 1999. There is a concern about the impact of these low water levels on fish and other wildlife species. The destruction of spawning grounds, e.g. shallows where bass spawn, could have a long lasting impact on the bass population in Bark Lake. Bark Lake is heavily fished, particularly during the winter months through ice fishing. There is a concern that one species of fish will have its habitat depleted to ensure that other species spawn successfully."

Response:

- The impact of low water levels in 1999 on other wildlife is not yet known. The effect on wildlife populations will be assessed concurrently with the issue identified in section 12.9, assessment of furbearers.

- Bark Lake no longer produces a natural lake trout population. It must be stocked annually and does create a "catch and release" situation.

- Walleye stocking is undertaken annually by private citizens and the local fish and game club. It is felt that the walleye population is doing well and was not affected by the low water levels because the fish spawn upstream of Bark Lake in the Madawaska River.

Action:

1. A study will be undertaken to assess the status of Bark Lake's fish and wildlife populations, with an emphasis on the impact of the 1999 record low water levels (See Information Needs Section).

3.0 INFORMATION NEEDS

Extensive public consultation and discussions with the Public Advisory Committee (PAC) were conducted in 1997/1998. A number of issues and concerns were identified with regard to the possible effects of Ontario Power Generation's (OPG) and Ministry of Natural Resources' (MNR) water management on fishery resources and the natural environment.

It was recognized early in the process that investigations would have to be carried out to better understand the river ecosystem, define the issues relative to hydroelectric operations and determine options for mitigation and compensation. The knowledge gained from the investigations would be used to provide answers to issues and concerns raised through the course of the water management review.

The other studies referenced in this section have been suggested during discussion with the public and the Public Advisory Committee. These are in an earlier stage of development and will be subject to revision based on public input and methodological constraints.

Completed studies will have one of two results:

1. Further study is required to assess the concern or issue.

2. An action is recommended to address the concern or issue

At this stage in the program, many investigations are in need of further study. However some studies have been completed and provided direct actions, such as habitat improvement, operational suggestions or regulation changes.

As studies are completed and the result determines there is need of further study, then a description will be added to the Information Needs section. If a new concern or issue is generated and an Information Need is identified, then the PAC or future Standing Committee can add to the Information Needs section. The studies will be prioritized by MNR and OPG and reviewed by the PAC or future Standing Committee.

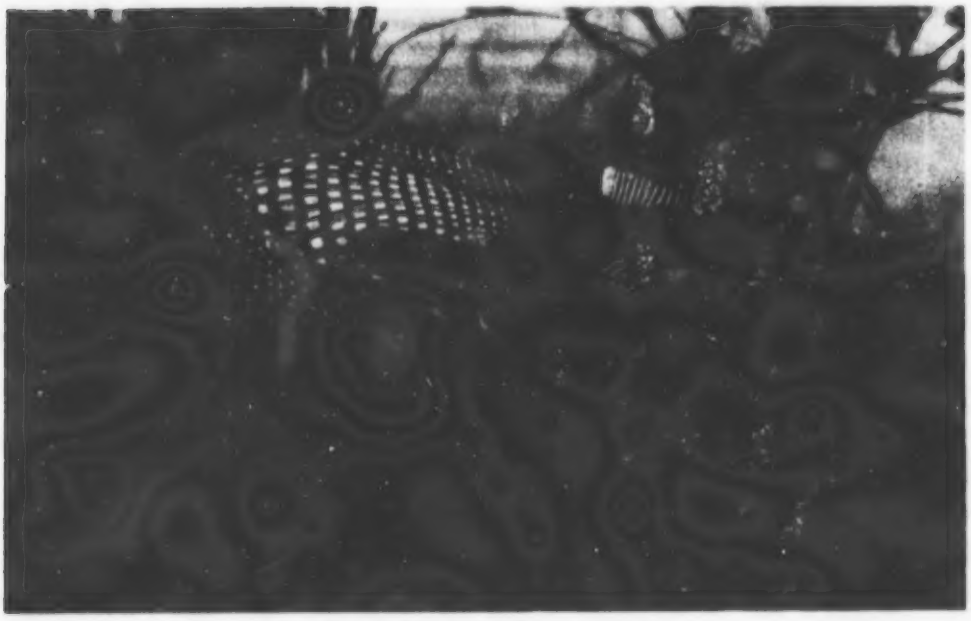
3.1 Information Needs – Aquatic

Proposed investigations continue a long history of work on the river conducted by MNR and OPG. For example, MNR commissioned a consultant study of OPG's effects on walleye spawning at three sites in 1992 and, with local fish and game clubs and other user groups, initiated the Walleye Watch to monitor spawning success along the whole river. OPG conducted environmental studies on the river in the 1970s in conjunction with the development of the Arnprior GS, and again in the late 1980s for the proposed redevelopment of the Calabogie GS.

Studies completed prior to the initiation of this review are listed. Some studies related to this Water Management Review were initiated in 1996 to address clearly understood issues. Reports have been prepared and others are pending in the near future. All completed and pending reports are referenced in this document and are available to the public on request.

Local involvement is needed at each step of the process - project development, project approval, setting priorities and project implementation. Ontario Power Generation, the Ministry of Natural Resources and local representatives will need to meet periodically to discuss proposed projects in order to resolve any issues at the outset, and to ensure stakeholder involvement throughout the process. Once such a schedule is in place, it would provide a feedback mechanism to both organizations as well as the Madawaska River Standing Committee.The organization of this document is designed to complement the Issues/Concerns/Solutions section. Information needs are numbered to correspond with the numbering in that report.

Figure 22
Information Needs



Loon

Walleye Spawning

3.1.1 Completed Projects - Aquatic

The listed projects were completed during the process of the Madawaska River Water Managament Review. Some projects will not have numbered sections that correspond to the Issues/Concerns/Solutions document because there was no concern identified by the working group or by the public. Results of completed projects will identify actions such as habitat mitigation, operational improvements, regulation changes or the need for further studies which will be incorporated into the Information Needs section. All studies listed in the Completed Project section will have a reference included within the Biological Bibliography.

Lake Trout Spawning Shoal Assessment - Kamaniskeg Lake 1997
Lake trout spawning shoals were identified and snorkeled during the fall of 1997. Each shoal with lake trout egg deposition was recorded and identified using a Global Positioning System (GPS).

Result: A summary report is on file at the Pembroke District MNR office.

Winter Creel Project - Kamaniskeg Lake 1998
A winter creel was conducted on Kamaniskeg Lake during the winter of 1998 as part of the South Central Ontario Lake Trout Strategy. A regulation change to protect self-sustaining population of lake trout was implemented for the winter of 1999.

Result: A summary report of the winter creel is available at the Pembroke District MNR office.

Preliminary Survey of Madawaska River Wetlands, Field Notes, July 1997, Ontario Hydro Report published 1998
A canoe trip was undertaken on the Madawaska River looking at wetland habitats and photographing various wetland areas.

Result: A report is available from OPG.

Action: Further studies required on effects of water management on wetlands throughout the Madawaska River system - (i.e. Conroy's Marsh, Griffith Marshes).

Walleye Watch Summary. "Effects of Hydroelectric Operations on Walleye Spawning, May, 1999". (2.3.17, 2.5.2, 2.6.5, 2.7.3, 2.8.1, 2.9.5, 2.10.1, 2.11.10)
A summary of Walleye Watch results and hydroelectric operations from 1997 and 1998 are assessed and evaluated for effect on spawning Walleye.

Result: Reports are available from OPG.

Declining Walleye Populations. "Fall Walleye Index Netting (FWIN) Centennial Lake, Oct. 1998". (2.9.6 , 2.3.2)
The current status of the walleye stock in Centennial and Black Donald Lakes was assessed in 1998 using MNR's Fall Walleye Index Netting (FWIN) methodology.

Result: A report is available from OPG.

Figure 23
Information Needs

Measuring Current Velocities

Adding Walleye Spawning Habitat at Barrett Chutes GS

Action: The results of the netting project showed a walleye population that is very low based on provincial standards using the FWIN protocol. A follow-up assessment using a full summer creel is planned for the summer of 1999.

Effects on Wetland and Riparian Ecosystems. "Aquatic Biodiversity of Griffith wetlands 1 and 2, Sept 1998" (2.9.7).
Observation of the spring filling of the reservoirs and associated flood zone wetlands was initiated in 1998. A consultant was hired by OPG, and a survey conducted in September 1998 to assess the status of fish and other aquatic organisms in two representative wetlands just upstream of Centennial Lake.

Result: A report is available from OPG. and Pembroke MNR District.

Action: Further studies of the wetlands were initiated in the spring of 1999 to determine the effect of water levels on spawning fish.

Information on Negeek Lake (2.11.9)
A Lake survey was completed in 1998 by Sustainable Resources Consulting. The survey included lake contour mapping, water chemistry and some fish spp. sampling

Result: A report is available from OPG and MNR, Pembroke District.

Action: Further information on the fish community and populations is required. A netting project such as Near Shore Community Index Netting or Fall Walleye Index Netting will be complete on Negeek Lake in 2000.

3.1.2 Studies Underway -Aquatic

Studies in this section are a result of the Issues/Concern/Solution document and have numbered sections that directly relate to this document. Some of the studies are near completion and will provide direct actions such as habitat mitigation, operational suggestions or regulation changes. Other studies are preliminary and will lead to recommendations for further study. Projects requiring further study will be updated in the Information Needs section.

Minimum Flows for Walleye Spawning in the North Channel (2.6.5)
Flow tests have been conducted and observations of spills and base flows have been made at the North Channel as part of this process from 1996 to 1998. Analysis of results and justification for the minimum flow recommendation will be made in an OPG report to be completed in 1999. Future observations will be made to test the effectiveness of the new minimum flow.

Assessment of the South Channel Walleye Spawning Shoals and Determination of Backwater effect of Stewartville GS (2.6.5).
As a result of the proposed changes at the North Channel, in the future, the South or Main Spill Channel will be used more frequently for spring spilling. A base flow cannot be provided at the South Channel to protect incubating eggs after the spill, but walleye may be able to spawn successfully just downstream of the spillway, if they spawn below the elevation protected by the backwater effect that originates either from the Stewartville Headpond (144.0 m) or the Cherry Beach Rapids (144+ m). The minimum backwater elevation at the South Channel will be determined from a water level gauge installed upstream of the Cherry Beach Rapids in 1998. Observations will

Figure 24
Information Needs

Tagging

Sampling

be made during the spring of 1999 to determine if ripe walleye are aggregating downstream of the South Channel. Where hydroelectric effects are deemed to be a primary limiting factor to the fishery, attempts will be made to mitigate or compensate for the effects.

Limiting Factors (spring water levels) to production of Walleye, Pike, Muskellunge and other Fish (2.6.7 , 2.3.2)
The last spring drawdown event occurred in 1995 and affected potential spawning areas such as the Springtown Marsh (pike, muskellunge) and the Cherry Beach Rapids. Spawning activity for Pike and Muskie was studied in these areas during the spring of 1999.

Assessment of the Fishery in Calabogie Lake and Relation of Water Flows to Recruitment of Walleye (2.7.2 , 2.3.2)
Fisheries netting projects were completed by MNR in the fall of 1995 and the spring of 1998 to assess the fish populations of Calabogie Lake. The studies indicated that recruitment to the spawning population has been poor since MNR stocking ceased in 1990. Year class strength since 1990 may provide some indication of natural spawning success that can be correlated to Barrett Chute GS spring operating patterns. A summary report will be completed and on file at the Pembroke District MNR in 1999.

Walleye Spawning at Mountain Chute GS (2.8.0)
Observations of spawning walleye have been made at the station since 1992, and station flow tests were conducted to study the distribution of flow from the two units since 1996. Because the units are large, operation of a single unit for walleye spawning provides excellent flows and current velocities for spawning throughout the tailwater area, including the artificial spawning shoals constructed by MNR and the fish and game clubs. Results will be published in the OPG report on walleye 1999.

Assessment of Pike Spawning Habitat (2.9.4 , 2.3.2)
There is a 4 m drawdown in Centennial Lake that leads to the winter de-watering of shoreline habitats favored by pike for spawning. Pike spawning areas in the reservoir and flood zone wetlands just upstream of Centennial Lake will be identified through canvassing local residents and anglers, or direct observation in the spring. Pike spawn during break-up and, in some years, it can be difficult to get into potential pike spawning areas to make observations. After pike spawning areas are identified, an assessment will be made of the potential effects of water management on reproduction. To assist with this analysis, a water level gauge was established upstream of Camel Chute in 1998. This work will be done as soon as we have a spring with the appropriate conditions. If a brief drawdown occurs in the spring, observations will be made of the stranding of fish in near shore pools and wetlands. A consultant was hired by OPG in the fall of 1998 to study the ecology of wetlands within Centennial Lake. A preliminary report will be completed in 1999.

Pike Spawning Habitat (2.9.4)
Assessment of pike spawning habitat and activities will be made in wetland areas of Black Donald/Centennial Lake during the spring of 1999. Due to wetland mapping and assessment projects initiated in 1998, further assessment of the studied wetland habitats is required to determine if pike are attempting to use these wetlands to spawn in spring. As well, the effect of the winter drawdown and timing of the re-flooding of the reservoir is to be assessed to determine the effect on pike populations.

Walleye Spawning Habitat (2.9.5)
Attempts will be made to confirm walleye spawning at Camel Chute in the spring of 1999. A Walleye Watch Program will be instituted in the area to monitor annual spawning stocks. Assessment of spawning habitat at Camel Chute and other areas in Centennial Lake will be completed during spring and summer of 1999.

Declining Walleye Population (2.9.6 , 2.3.2)
A Fall Walleye Index Netting (FWIN) project initiated in 1998 had preliminary results that showed poor walleye populations in Black Donald/Centennial Lake. Further assessment is required to determine the reasons for the decline in the walleye population. An angler creel is suggested at this time to determine fishing effort and catch rates of walleye and other fish species. The results of the FWIN project combined with an angler creel and the results of Information Needs 9.4 and 9.5 should provide enough information to develop a preliminary fisheries management plan for Black Donald/Centennial Lake. An angler creel was completed during the summer of 1999, and the report on this will be available from Pembroke District MNR in the winter of 2000.

Exposed Walleye Spawning Beds at Palmer Rapids (2.10.2)
Spring observations will be made of the distribution of spawning materials and fish at the spawning sites. The spawning areas will be investigated to determine the feasibility of creating new artificial habitat that will have a lower risk of de-watering after the spring freshet – spring and summer of 1999.

Drowning of Furbearers during Winter Drawdowns and the Effect of Winter Drawdown on Muskrat in Conroy's Marsh (2.10.3 , 2.11.7)
Because of reservoir drawdowns in the early winter including Bark Lake, flows in the Madawaska downstream of Palmer Rapids are unusually high for this time of year. High flows flood out muskrat lodges that are built in the late fall when flows are lower. Local trappers were interviewed during 1997 and 1998. A report will be prepared by MNR on the status of furbearers, especially muskrat, in the upper Madawaska River including Conroy's Marsh in 1999. If warranted, an analysis will be made of potential water management effects on muskrat.

Effect of Water Level Regulation on Productivity of Aquatic Species and Furbearers in Conroy's Marsh (2.11.6)
A tour of Conroy's Marsh was made with Ducks Unlimited in 1998 to get an assessment of the health of the marsh. A report will be completed in 1999.

3.1.3 Information Needs Program

Issues and Concerns 2.3.1 and 2.3.24 outline the requirement to identify information needs and put together a program to collect data. The program is prioritized with results being delivered in 1999. The following information needs are a direct result of the Issues/Concerns/Solutions document and are listed in order to correspond with that document.

Reduced Angling Opportunities (2.3.2) issue and concern is generic to the whole Madawaska River system. Assessing this concern will involve studies that include fisheries assessment through netting projects or through angler creel surveys. Information needs for specific reaches will be identified below, and this generic issue and concern will be linked to the information need from the specific reach. It is assumed information needs directly related to this generic issue and concern will develop new concerns that will be added and prioritized.

Limiting Factors (spring water levels) to Production of Walleye, Pike, Muskellunge and other Fish (2.6.7 , 2.3.2)
Walleye spawning at the Cherry Beach Rapids was assessed during the spring of 1999. This is a difficult place to assess due to wet springs with high flows (e.g. 1997-98). The feasibility of assessing the status of walleye stocks in this riverine reach will be investigated during 2000.

Populations in Tributaries of Madawaska Lake (2.5.1 , 2.3.2)
MNR will solicit public assistance in identifying traditional spawning areas in the tributaries of Lake Madawaska – spring 1999. An assessment of fish species composition and stocks will be conducted in Lake Madawaska to update the last detailed survey (Arnprior Reservoir Fish Studies – 1997) conducted by OPG in 1977, a year after reservoir creation. Reproduction for walleye will be related to hydrological and hydraulic conditions during the spring spawning and incubation – spring/summer 2000.

Effects of Spring Flooding and Daily Summer Water Level Fluctuations on Waterfowl (i.e. loons and grebes) (2.9.7)
Waterfowl species that nest over water (i.e. loons and grebes) frequenting this reach will be identified, and a review conducted of their biology to identify nesting habitat and seasonality. An investigation will be made of the generic effects of water level fluctuations on nesting success. An analysis will be conducted of the potential effects of historical Madawaska flows and water levels on waterfowl nesting. If warranted, an assessment will be made by OPG of potential approaches to mitigate effects on waterfowl nesting.

Information on Negeek Lake (2.11.9)
A lake survey was completed in 1998. To further assess the fish population of Negeek Lake a Community Near Shore Index Netting project is recommended to determine abundance and diversity of fish species living in this lake.

Review and Assessment of Stocking Deep Spawning Lake Trout (2.12.6)
The indigenous lake trout stocks in Bark Lake have been extirpated as a result of the 10 m winter drawdown by OPG over the years. However, some stocks of lake trout are believed to selectively spawn on shoals deeper than 10 m. and may be able to survive. These would be able to create a sustainable fishery not dependent on stocking. A review of the availability of these stocks and an assessment of habitat is required.

Information on Walleye Downstream from Palmer Rapids to Griffith (2.10.4)
Very little information exists about fisheries downstream from Palmer Rapids to the Town of Griffith. Due to the riverine nature of this reach, assessment is very difficult using standard fisheries management protocols. Separating this section into two parts, the upper slow water area (Palmer Rapids to downstream of Latchford Bridge) and the lower fast water area (Latchford Bridge to Griffith Bridge), some assessment measures can be implemented. On the upper slow water area from Palmer Rapids to below Latchford Bridge, a bathymetry survey is required. Once the bathymetry is complete, a fisheries inventory project using trap nets or an electro-fishing boat, could be implemented. On the lower stretch of river from Latchford Bridge to Griffith, a survey using angling or short-set gillnetting would be the only feasible way to inventory this section of river. Projects for this reac could be implemented by the summer of 2002.

Effects of Winter Drawdown on Furbearers in Bark Lake (2.12.9)
An aerial survey of Bark Lake and areas affected by the over-winter drawdown during the fall (late October) would assess the number of beaver lodges and muskrat houses existing within this reach. At this time of the year, active beaver lodges are easy to identify because of the food shortage bed a beaver makes in preparation for winter. Muskrat houses are built annually and are easily observed and counted. A preliminary report investigating the occurrence of beavers and muskrats will be completed with recommendations for future surveys and methods to manage animals existing within the Bark Lake reach. Project completion is targeted for the fall of 2002.

Undertake a Study of the Status of the Bark Lake Fishery (2.12.11)
There seems to be concern about the status of a number of fish species in Bark Lake, particularly because of the record low water levels experienced in 1999. In order to know the answers to the numerous questions being posed about the various fish species in Bark Lake, a survey will be conducted in order to gather information on the numbers and types of species, health of fish populations, species distribution, condition of spawning beds, etc. In conjunction with the study on the status of Bark Lake fisheries, a study will be undertaken to determine what impact, if any, the extreme record low 1999 water levels may have had on Bark Lake's wildlife population.

Impact of Record Low Water Levels on Bark Lake on Wildlife other than Fish (2.12.11)
In conjunction with the study on the status of Bark Lake fisheries, a study will be undertaken to determine what impact, if any, the extreme record low 1999 water levels may have had on Bark Lake's wildlife population

3.2 Inormation Needs – Other (Non Aquatic)

This section deals with information needs that are non-aquatic. Completed and pending reports referenced in this document are available to the public on request. The following sections are numbered to correspond with the numbering in Issues/Concerns/Solutions.

3.2.1 Completed Studies - Other

Projects listed in this section are projects that were completed during the process of the Madawaska River Water Management Review.

Economic contribution of tourism (2.3.4)
An economic profile of the Madawaska River including tourism was completed. A report is available.

The report discusses the difficulty of assigning a value to the recreational fishery. Reliable estimates of the number and quality of fishing days do not exist and gathering the data was beyond the scope of the baseline study. Further work is required to place a value on the recreational fishery.

MNR has suggested this item is important and is included in the future Information Needs.

1997 Visitor Survey of the Madawaska River (2.3.4)
As part of the public consultation process, and in an effort to canvass summer seasonal users of the Madawaska River, a preliminary study was undertaken during July and August of 1997. The topics included:

- origin of the users
- age group
- length of stay
- frequency of visit
- type of accommodation
- activities participated in
- amount of money spent per visit

A copy of this report can be found in Appendix #6.12.

3.2.2 Sudies Underway - Other

Generating station/storage dam portage routes (2.3.10)
OPG will open portage routes around its facilities on the Madawaska River. OPG is concerned about safety issues. A safe route around each facility will be established. OPG will facilitate access to portage routes on adjacent private lands if necessary. MNR will help with clearing the portage routes.

The target for completion is the end of 2000.

A brochure will be developed describing the location of the portages as part of a communication program to raise the public's awareness of its existence.

Shoreline erosion (2.3.3)
MNR and OPG will conduct an erosion workshop to assist shoreline dwellers with potential solutions. The objective will be to provide the public with a forum to discuss erosion issues with experts in the field. The information presented can be packaged for future use as a resource kit.

The program was initially expected to be in place for the fall of 1999 and now has been moved into 2000. Additional workshops will be organized if there is sufficient public demand.

MNR Controlled Storages – Bancroft District/Algonquin Provincial Park (2.12.10)
The Madawaska River Water Management Plan would be incomplete without considering upstream MNR facilities. Operating criteria are to be included for the major sites. An operating protocol between MNR and OPG that covers all time periods is to be established.

The issue of using upstream storage water controlled by the Bancroft District MNR and Algonquin Park to offset low Bark Lake water levels, has been raised repeatedly given dry spring conditions. A review will determine what, if any, contribution the upstream components can provide. A consultation program will be required to allow input from various users.

MNR will hold a meeting with the various districts in early September to discuss the problem, explore alternatives and put together a plan to gather information. An operating protocol will be in place for the spring of 2000.

Bark Lake Drawdown (2.12.10)
Bark Lake has a winter drawdown of 9 m to provide storage to reduce flooding on the Madawaska River, and spill at hydroelectric stations. Given the drought of 1999 and Bark Lake being 3 m below the voluntary summer target for end of May, the drawdown target on Bark Lake will be reviewed by OPG to determine the impact of reducing it on refilling the lake, and providing flood protection.

The study will be completed before Bark Lake is emptied to prepare for freshet in 2000.

The open or closed valve limitation at Bark Lake Dam will be reviewed by OPG to determine if modifications to vary the opening are possible.

3.2.3 Additional Information Needs - Other

Evaluation of the Recreational Fishery (2.3.4)
In 1999, the Madawaska River Water Management Review published an "Economic Profile of the Madawaska River System", by Hagler Bailly. In the section on recreational values, Hagler Bailly concluded that there was limited information available describing recreational uses and values in the system, but that angling was a major use. Angling was reported to be a major driver of revenues at resorts and campgrounds along the river. It is also a major recreational activity that has a significant non-market value for local residents.

The Madawaska River Water Management Review proposes to take a closer look at the amount of recreational angling, using recent creel survey information collected as part of this program (see Information Needs 9.6 & 3.2) and routine MNR resource management. It should be possible to evaluate this activity using standard benefits transfer methods for non-market benefits. Benefits transfer methods draw value estimates from previous (non-market) valuation studies that match as closely as possible the characteristics of the subject activity.

The Madawaska River attracts many recreational anglers to the watershed and the activity is perceived to make a significant financial contribution to the area. An estimate of the contribution the recreational fishery makes could provide useful information to balance the competing uses for Madawaska River water management.

4.0 Madawaska River - Water Management Plan

The Water Management Plan defines operating criteria for the Madawaska River.

Operating criteria were reviewed by the Working Group (composed of staff from Ministry of Natural Resources (MNR) and Ontario Power Generation (OPG)) with help from the Public Advisory Committee.

Public input was provided from three phases of open houses and focus group meetings held in the watershed.

The Ministry of the Environment (MOE) and the Department of Fisheries and Oceans (DFO) were represented in the process.

The following is a summary of operating constraints for storage lakes and generating stations controlled by OPG that are currently approved. Operational criteria are expected to change as data become available from the information needs study process.

The Water Management Plan at this stage deals primarily with OPG operated structures. There is coordination with upstream reservoirs controlled by MNR during spring freshet. The drought of 1999 has raised questions about the contribution upstream storages can make to improve low water levels. MNR is reviewing the operation of its storages. Results from this review will be included at a later date.

The water management plan identifies operational constraints as follows:

- OPG constraints – constraints developed due to the electrical, structural or legal requirements of the storage/generating facility. Each location has a normal operating range. Some have additional storage available for flood protection or energy reserve during critical periods.

- Citizenship constraints – constraints developed to benefit other uses of the water, such as summer levels to enhance recreational activities, are subject to watershed conditions. A reasonable effort is made to fulfill the constraint. However, OPG electrical system constraints and obligations will not be violated to meet citizenship constraints.

- Environmental constraints – constraints developed to protect or enhance the natural environment.

There are two categories of operating limits. Limits such as maximum and minimum reservoir levels and fisheries requirements must not be violated. Voluntary constraints such as summer reservoir levels are adhered to on a reasonable effort basis, and can be exceeded during electrical system contingency or extreme conditions.

4.1 OPG Operating Constraints

Water level graphs are provided as an attachment. Operating ranges for OPG's seven storage reservoirs and generating stations are shown. The median level (50% time exceedence) for a given time period, along with 25% of time and 75% of exceedence bands are included.

The median level corresponds to the expected average value. The operating bands are described in terms of probability as follows:

- 2 out of 4 years, the level can be expected to between the 25% and 75% of time exceedence band

- 1 out of 4 years, the level can be expected to above the 25% of time exceedence band

- 1 out of 4 years, the level can be expected to below the 75% of time exceedence band

The graphs are based on data from the last 25 years of operation. The Bark Lake graph (fig 1) shows the level dropping below operating minimum more than 1 in 4 years. The operation of the lake has changed to improve the probability of spring refill to the summer minimum. OPG does not lower the lake below 304.8 m.

4.1.1 Bark Lake

Bark Lake Level Constraints:

	Elevation Range (m)	Elevation Range (m)	Duration	Comments
Normal Operating Range	304.8 - 313.90	9.10	Always	OPG Constraint See Operating Note 1
Absolute Range	304.5 - 313.94	9.44	Always	OPG Constraint
Summer Operating Range	313.62 - 313.80	0.18	Victoria Day-Thanksgiving Day Weekend	Citizenship Constraint
Fish Spawn Constraint			During the Spring Spawn & Incubation Period	Environmental Constraint Avoid Lowering the Lake Level Once the Spawn has Started

Operating Note

1.0

The Licence of Occupation provides flooding rights for OPG on Bark Lake to 313.94 m. OPG limits the level rise to 313.90 m which appears to control basement flooding in the village of Madawaska. The amount of storage above 313.90 m is insignificant for flood control and does not impact regulation decisions and users downstream.

Bark Lake Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Minimum Flow	2.8	Always	Environmental Constraint Flow Required to Avoid Stranding Fish in Pools Downstream of Bark Lake
Flood Threshold Flow	150	Always	Citizenship Constraint Flooding Downstream When Flow is Exceeded
Walleye Spawning Flow	15	Spring Spawning (Typical 1 Week)	Environmental Constraints Spawning at Bells Rapids Typically Lasts for a Week Dependent on Inflow Conditions See Operating Note 1
Walleye Incubation Flow	5	Egg Incubation (3-4 Weeks)	Environmental Constraint During a Wet Freshet, 15 m3/s is Preferred See Operating Note 1
Whitewater Recreation Flow	25.6	Victoria Day-Labour Day Weekend/a Few Days a Week for a Limited Time Each Day	Citizen Constraints; Depends on Inflows into Bark Lake See Operating Note 2

Operating Notes

1.0

The following is the operating strategy for Bark Lake discharge during the walleye spawning/incubation period:

- Pass 15 cms from Bark Lake during the peak spawning period to keep walleye in the centre of the river channel.
- Maintain 15 cms during the incubation period if water supplies permit.
- During a dry freshet, reduce Bark Lake discharge to 5 cms after spawning is completed if needed to refill Bark Lake to the summer minimum target level.
- During a wet freshet, increase Bark Lake discharge for level control if needed. If 25 cms or more water is passed during spawning, 25 cms becomes the minimum flow required during the entire incubation period.

2.0

The proposed Bark Lake flow releases from May to September are:

- Madawaska Kanu Centre (MKC) receives the 26 hrs of midweek water dispatch (25.6 cms) until Bark Lake reaches 313.62 m.
- MKC midweek water reduced from 26 hr/week to 18 hr/week.
- When Bark Lake reaches 313.50 m, Bark Lake discharge will be reduced. The amount and timing of flow releases will be negotiated and depend on inflow conditions, time of year and impact.

Bark Lake minimum discharge is approximately 3 cms. This is an MNR fisheries requirement and must be passed. If the inflow into Bark Lake is less than 3 cms during a drought, the lake level will decline even without whitewater releases.

The Ministry of the Environment (MOE) minimum flow at the Arnprior GS is approximately 10 cms for pollution dilution requirements. Under most cases, local inflow from Kamaniskeg Lake to Arnprior GS, combined with the approximately 3 cms from Bark Lake is enough to provide for the Arnprior minimum. Additional water from Bark Lake to support the Arnprior minimum over and above the approximately 3 cms may be required potentially reducing Bark Lake level below 313.50 m during dry conditions.

The preceding discussion assumes Bark Lake reaches the summer minimum and water is available to support MKC activities. Drought conditions can cause Bark Lake not to fill. Releases for MKC will be open for discussion in order to achieve a reasonable outcome between upstream and downstream users.

4.1.2 Kamaniskeg Lake

Kamaniskeg Lake Level Constraints:

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	282.24-283.46	1.22	Always	OPG Constraint
Absolute Range	282.24-283.46	1.22	Always	OPG Constraint
Summer Operating Range	282.88-283.06	0.18	Victoria Day Weekend - Thanksgiving DayWeekend	Citizenship Constraint
Muskrat Restriction		0.12	Freeze Up to Spring Thaw	Environmental Constraint See Operating Note 1

Operating Notes

1.0

To minimize the impact on muskrats in Conroy's Marsh, regulation of Kamaniskeg Lake is maintained in a narrow operating band during the winter.

The regulation of Kamaniskeg Lake as determined from the Barry's Bay gauge applies until freeze-up. However, at freeze-up, the elevation at the Upper Gauge at Palmer Rapids Dam is recorded and 0.03 m deducted from the elevation. This new elevation $\pm$ 0.06 m shall be the one used to establish the upper and lower limits on Kamaniskeg Lake until freshet.

Kamaniskeg Lake Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Minimum Flow	10	Always	Environmental Constraint Desired Flow to Maintain Water Quality Downstream. Depends on Inflows into Kamaniskeg
White Water Recreation Flow	23.6 - 42.5	Victoria Day Weekend to Thanksgiving Day Weekend	Citizen Constraint Depends on Water Availability Kamaniskeg Lake will not be Lowered to Support the Flow

4.1.3 Mountain Chute GS

Centennial Lake Level Constraints (Mountain Chute forebay):

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	243.80 - 248.40	4.60	Always	OPG Constraint
Flood Allowance	248.40 - 249.00	0.60	Always	OPG Constraint
Energy Reserve	243.54 - 243.80	0.26	Always	OPG Constraint
Absolute Range	243.54 - 249.00	5.46	Always	OPG Constraint
Summer Operating Range	247.80 - 248.40 248.00 - 248.40	0.60 0.40	Victoria Day - Thanksgiving Day Weekend	Citizenship Constraint Narrower Range Applies from Canada Day to Labour Day See Operating Note 1
Winter Operation	247.80 - 248.00	0.20	During Winter Freeze Up	Citizenship Constraint See Operating Note 2
Pike Spawn Constraint			Spring Spawn and Incubation Period	Environmental Constraint Avoid Re-Drawing the lake Elevation Once the Spawn has Started

Operating Notes

1.0

The narrow range applies to the peak recreation use months of July and August. A lower operating limit of 248.0 applies, but with potential short excursions of a short duration to 247.8 during energy shortages.

2.0

The amount of shoreline ice damage seems to be reduced if the Centennial Lake level is held lower during the initial formation of ice in the winter. The normal operating range is available once freeze up is complete. Freeze up usually takes 7-10 days. Additional surveys will be done to verify if this process is useful.

Mountain Chute GS Flow Constraint:

	Flow (m^3/s)	Duration	Comments
Walleye Spawning Flow	100	During Spring Spawning from 20:00 to 23:00 EST	Environmental Constraint Water is Released to Stimulate Walleye Spawning Grounds

4.1.4 Barrett Chute GS

Barrett Chute Forebay Level Constraints:

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	198.73 - 201.17	2.44	Always	OPG Constraint
Absolute Range	198.73 - 201.17	2.44	Always	OPG Constraint
Summer Operating Range	200.70 - 201.17	0.47	Victoria Day - Thanksgiving Day Weekend	Citizenship Constraint
Pike Spawn Constraint	200.90 - 201.17	0.27	During the Spring Spawn and Incubation Period	Environmental Constraint Ensures Spawning Beds in the Mountain Chute Tailrace Remain Covered

Barrett Chute Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Walleye Spawning Flow	43	During Spring Spawning from 20:00 - 23:00 EST	Environmental Constraint Water is Released to Stimulate Walleye Spawning

4.1.5 Calabogie GS

Calabogie Lake Level Constraints:

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	153.56 - 154.10	0.54	Always	OPG Constraint
Absolute Range	153.56 - 154.17	0.61	Always	OPG Constraint
Summer Operating Range	153.80 - 154.10	0.30	Victoria Day - Thanksgiving Day Weekend	Citizenship Constraint
Walleye Spawn Constraint	153.80 - 154.05		During the Spring Spawn and Incubation Period	Environmental Constraint See Operating Note 1

Calabogie GS Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Minimum Flow	0.8	Always	Environmental Constraint Flow to Maintain Water Qyuality Downstream in North Channel
Walleye Spawning Flow	15	During Spring Spawning and Incubation	Environmental Constraint Applies to the North Channel See Operating Note 2

Operating Notes

1.0

The Calabogie forebay is limited until the walleye have spawned at Constant Creek. Once the walleye have finished spawning only the minimum elevation applies.

2.0

MNR and OPG performed a series of flow tests in 1996-98 and developed a strategy for managing flow in the North Channel:

- OPG can spill as needed prior to spawning,
- Reduce the flow to 15 cms during the spawning and incubation period.
- If inflows in the river drop to less than Calabogie GS plant capacity (approximately 70 cms), reduce the North Channel to no less than 5 cms during incubation.
- Spill more water later if required to control lake level.

4.1.6 Stewartville GS

Stewartville GS Forebay Level Constraints:

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	143.50 - 144.78	1.28	Always	OPG Constraint See Operating Note 1
Absolute Range	142.65- 144.78	2.13	Always	OPG Constraint
Energy Reserve	142.65 - 143.50	0.85	Always	Citizenship Constraint
Summer Operating Range	144.00 - 144.78 144.48 - 144.78	0.78 0.30	Victoria Day Weekend to Thanksgiving Day Weekend	Citizenship Constraint Depends on Inflow Measured at Mountain Chute See Operating Note 2
Spawn Constraint	144.00- 144.78	0.78	April 1 - Victoria Day Weekend	Environmental Constraint Keep the Forebay above 144.00 m to Inprove Spawning Habitat at Springtown Marsh and Cherry Beach See Operating Note 3

Operating Notes

1.0

Stewartville GS water level fluctuations normally do not exceed 1 m outside of the summer period. A lower operating limit of 143.50 m outside the summer period but with potential excursions during energy shortages resolves most concerns.

2.0

Operation of the Stewartville forebay has been changed to reflect supply conditions in the watershed during the summer recreation season.

- If the supply of water as measured into Mountain Chute GS is less than 53.6 cms, then the Stewartville forebay is limited to 144.48-144.78 m (0.3 m) .
- If the supply of water as measured into Mountain Chute GS is greater than 53.6 cms, the Stewartville forebay is limited to 144.0-144.78 m (0.78 m).
- If the 0.78 m range is in use, Calabogie GS is to be scheduled to ensure the Stewartville forebay level rebuilds and is not left in the lower sector of the operating range for an extended period of time.

3.0

OPG has taken action to protect pike and muskie spawning conditions by placing a lower limit of 144.0 m on the Stewartville GS forebay from April 1 of each year. The operating restriction remains in place until the summer level restriction comes into force on the May long weekend.

Stewartville GS Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Walleye Spawning Flow	50	During Spring Spawning from 20:00 to 23:00 EST	Environmental Constraint Water is Released to Induce Walleye to Stimulate Spawning

4.1.7 Arnprior GS

Lake Madasaka Level Constraints (Arnprior forebay):

	Elevation Range (m-CGD)	Elevation Range (m)	Duration	Comments
Normal Operating Range	98.76 - 99.06	0.30	Always	OPG Constraint
Energy Reserve	98.45 - 98.76	0.31	Always	OPG Constraint
Absolute Range	98.45 - 99.06	0.61	Always	OPG Constraint

Amprior GS Flow Constraints:

	Flow (m^3/s)	Duration	Comments
Minimum Flow	214.4	Once Every 24 Hours for One Hour	Environmental Constraint Flow Required to Dilute Pollution
Minimum Flow	1 Unit Flow	Victoria Day - Thanksgiving Day Weekend	Citizenship Constraint Downstream Recreational Uses See Operating Note 1

Operating Note:

1.0

Amprior GS has 2 generating units. The second unit is usually operated if there is more water than one unit can pass in 24 hours. The second unit operates after the May long weekend if freshet is later than normal, or if the watershed receives significant precipitation. Two unit operation may be required infrequently during energy shortages.

Figure 25
Typical Operating Band - Bark Lake

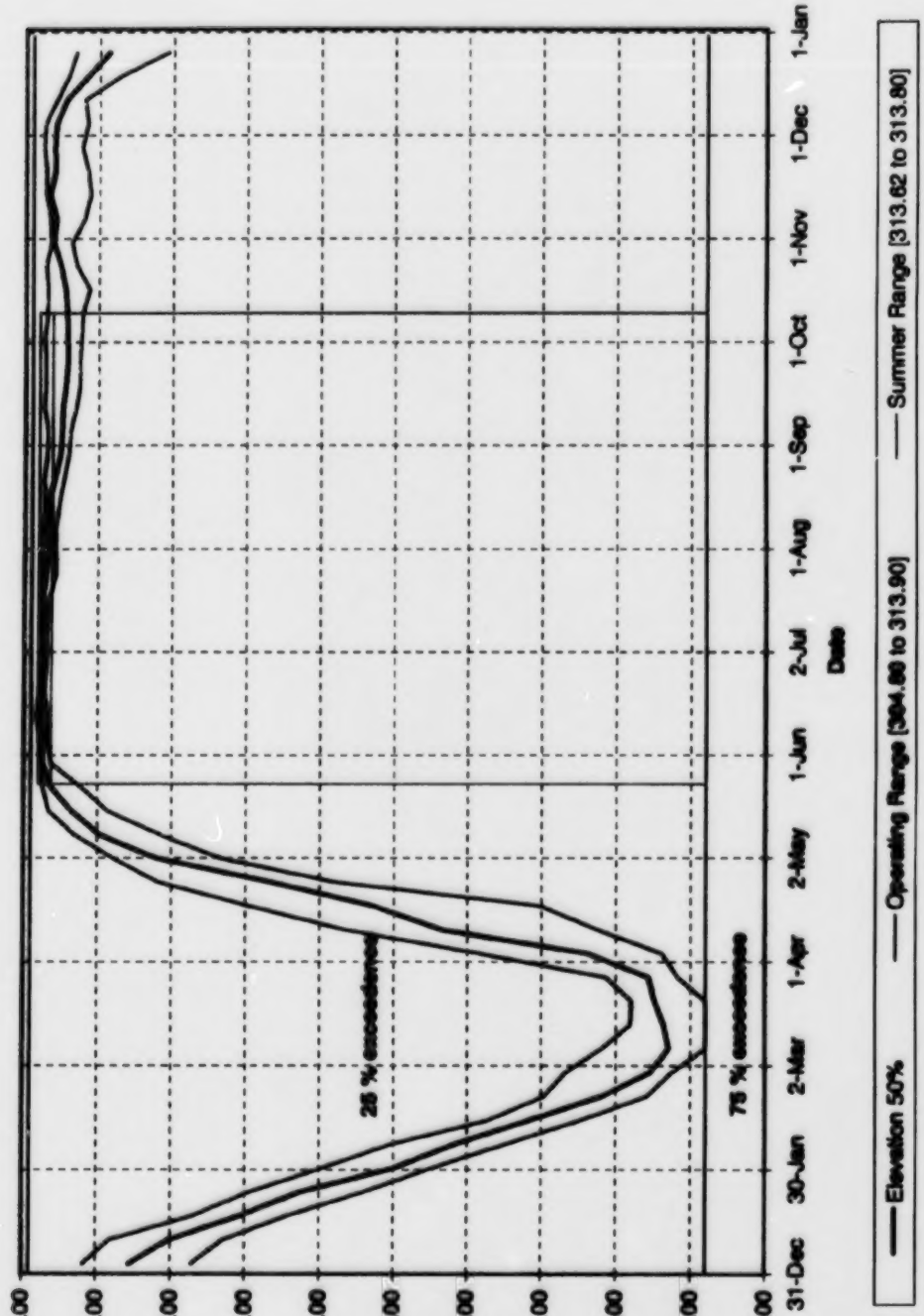


Figure 26
Typical Operating Band - Kamaniskeg lake

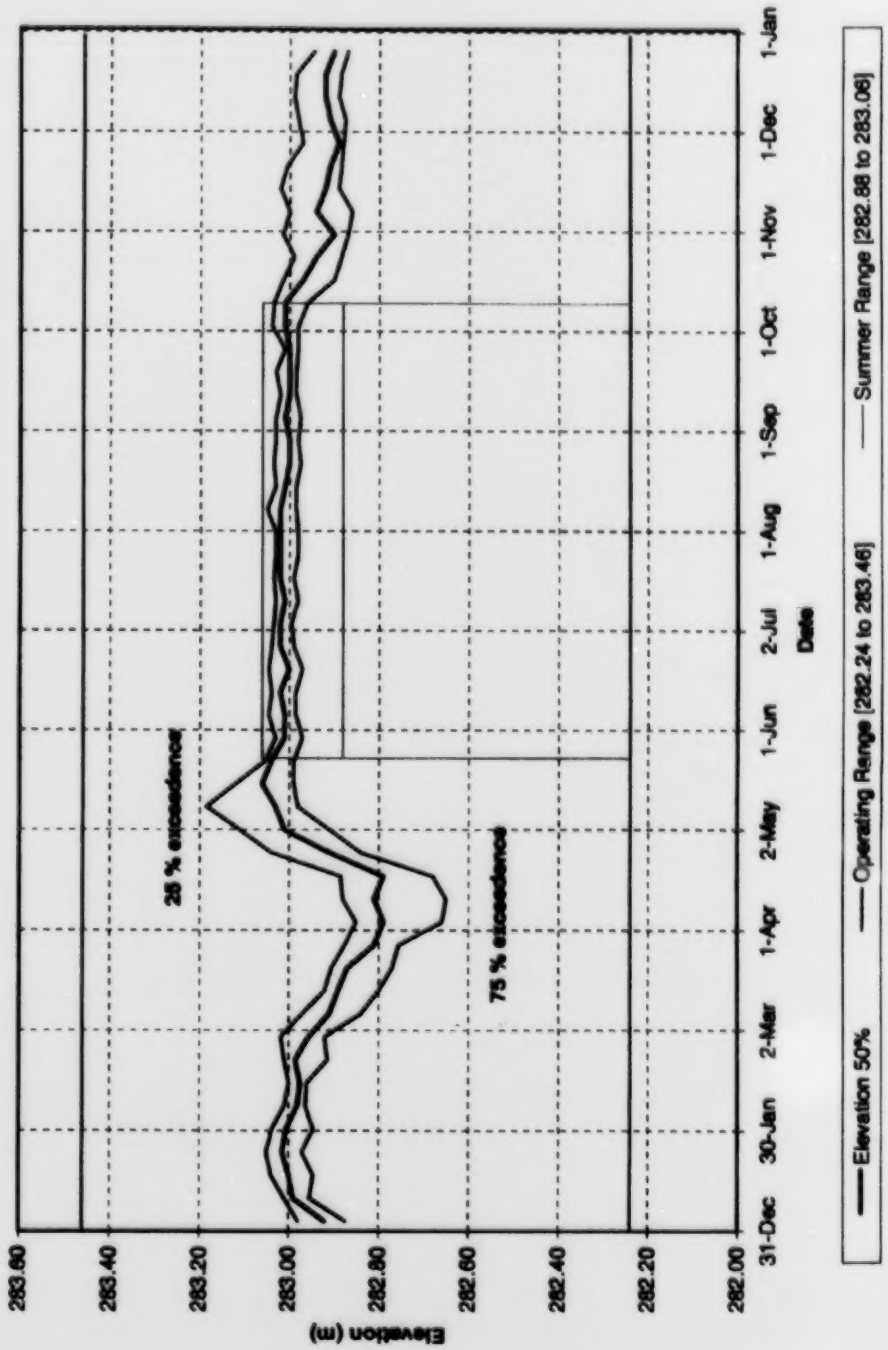


Figure 27
Typical Operating Band - Mountain Chute GS

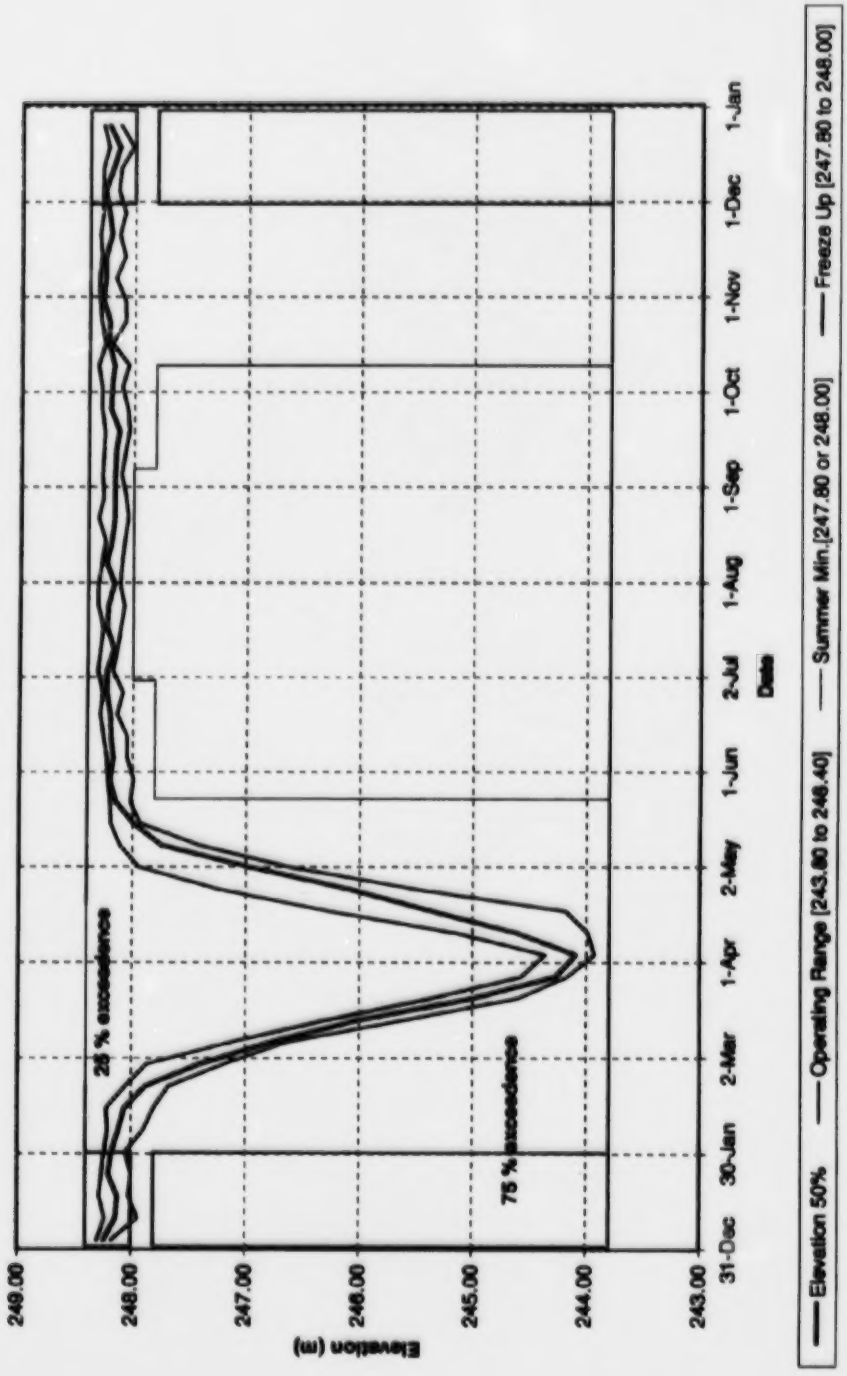


Figure 28
Typical Operating Band - Barrett Chute GS

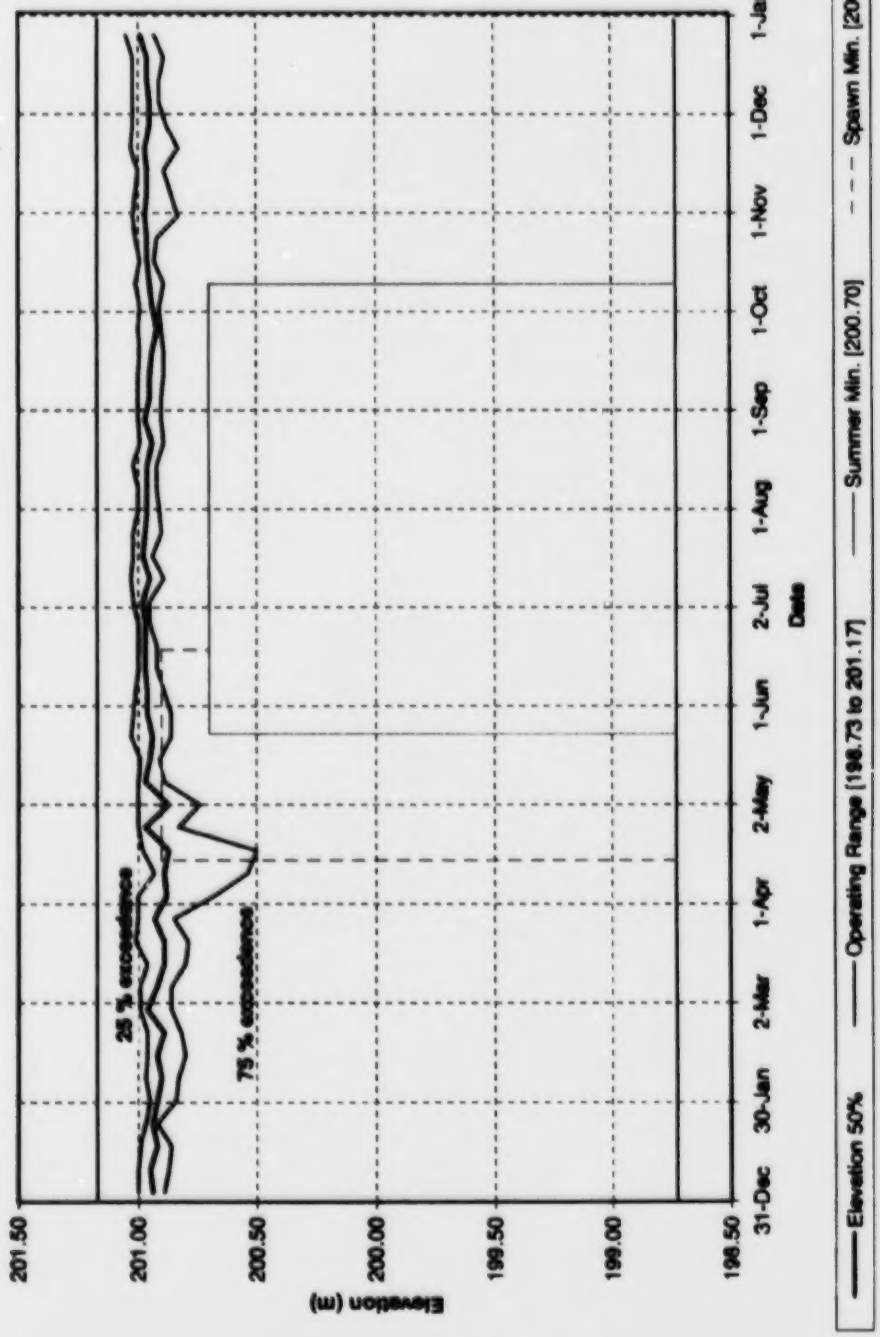


Figure 29
Typical Operating Band - Calabogie GS

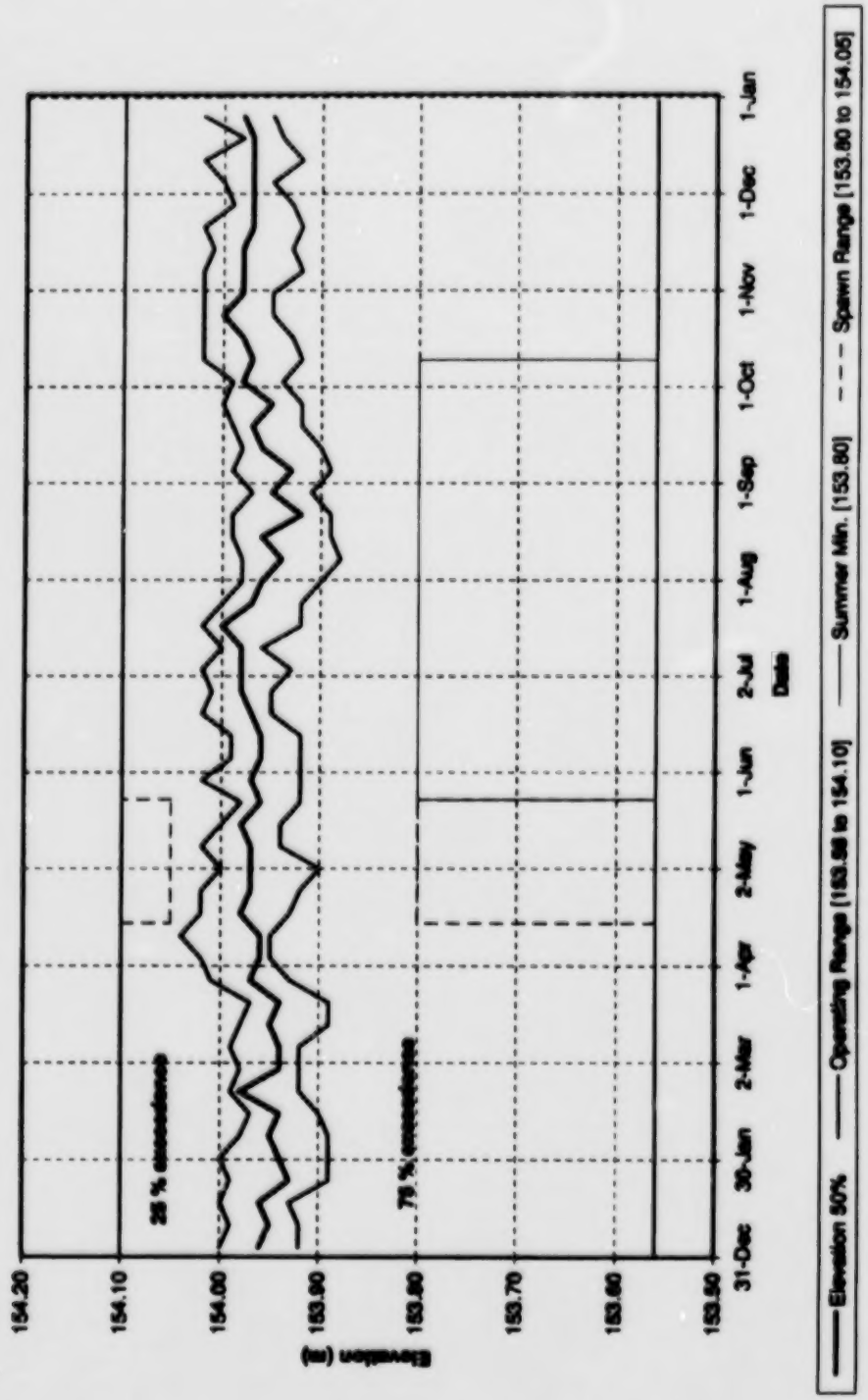


Figure 30
Typical Operating Band - Stewartville GS

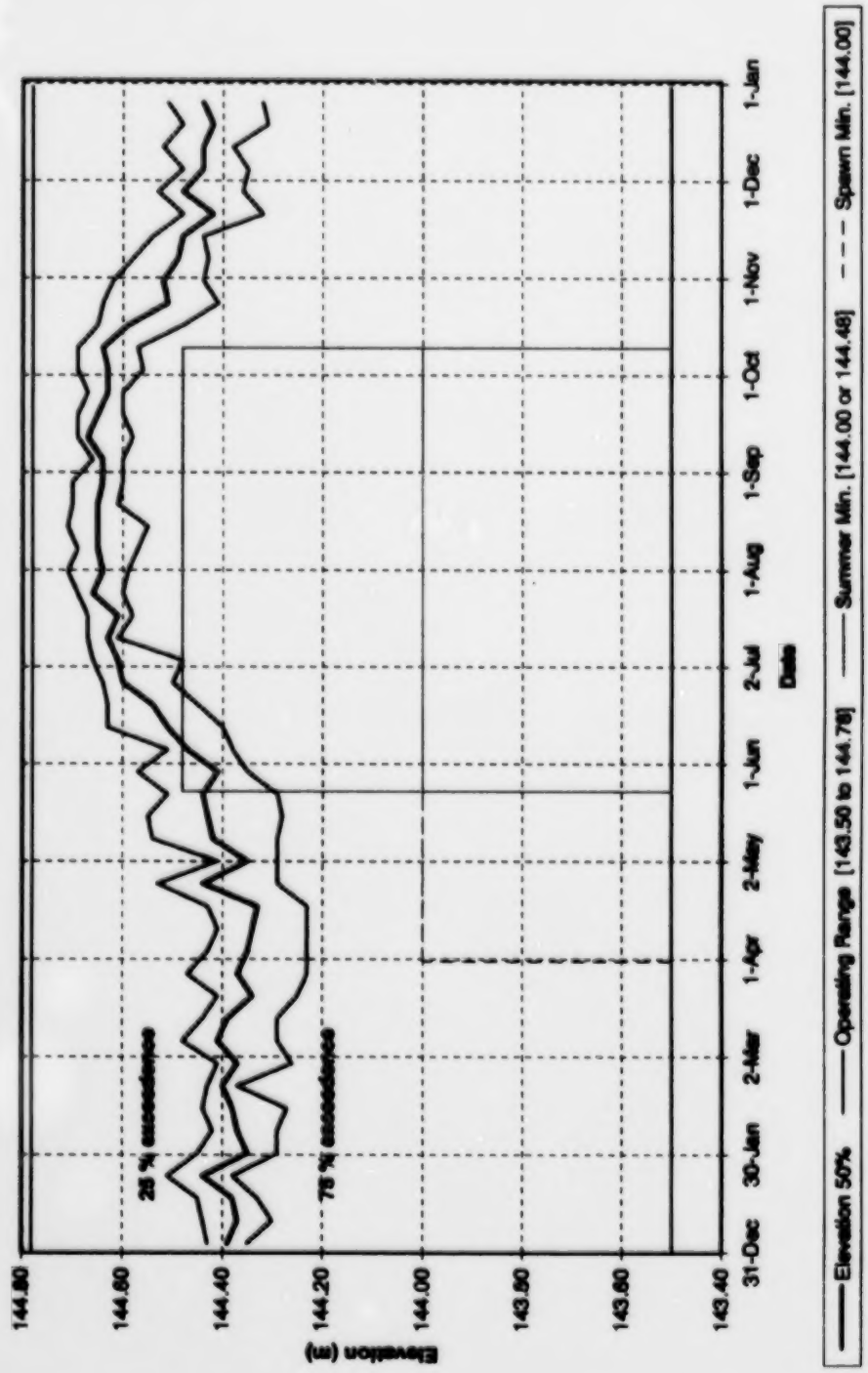
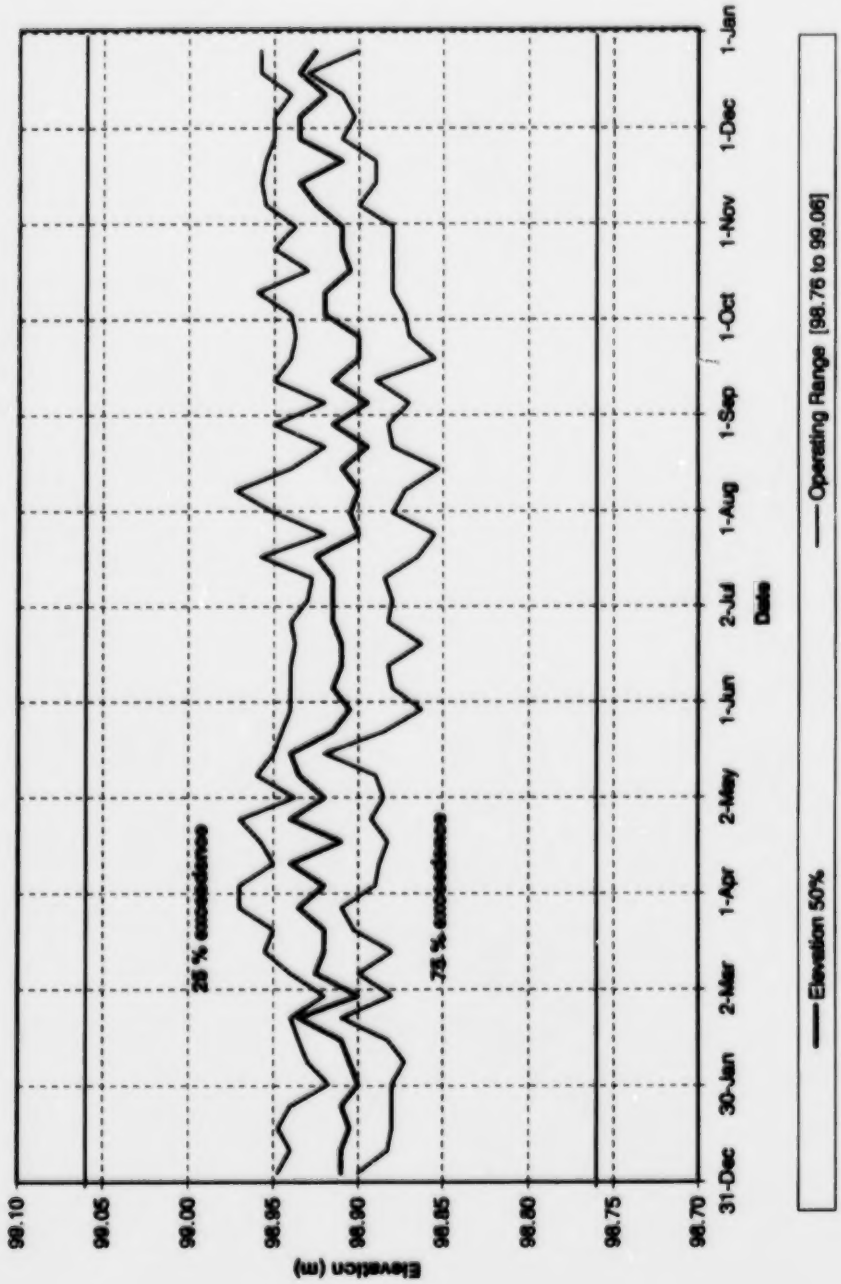


Figure 31
Typical Operating Band - Arnprior GS



4.2 MNR OPERATING CONSTRAINTS

MNR-operated dams are operated primarily for enhancing recreation and the fishery. The amount of usable storage is small, providing minimal flood protection.

4.2.1 Aylen Lake Dam

The dam is a single gate 10 log structure.

The following is the operating plan:

- May to September 15: desired level 7.9 ft – 10 logs in
    - Lake Trout drawdown to 7.0 begins early September (2 Logs Out)

4.2.2 Galeairy Lake

This structure is a six gate, 7 log dam.

The operating plan is as follows;

- Summer desired level is 389.6 ft.
- Lake Trout require a drawdown in early September to 389.3. Replace two logs per gate and maintain level at 389.5.for winter months
- Daily inspection and log placements during spring freshet.
- River flows to be maintained during and following pickerel spawn in river.
- Normal years - minimal log adjustment during summer period.

The main user groups are;

- Township of South Algonquin, beach, boat launch and dock
- 2 lodges
- Numerous permanent residents
- Approximately 20 seasonal cottages
- Major part of lake is within Algonquin Park
- Major canoe access to Algonquin Park

Fisheries issues are;

- The lake has natural reproducing lake trout. Spawning mid October in 1-1.5 metres of water on near shore shoals. Drawdown must be completed prior to spawning to avoid exposing eggs to air or ice. Hatch mid February; fry emergence occurring in March to April.
- Small mouth bass spawning mid to late May, incubate eggs and guard nests in June.
- Whitefish spawn in November
- Pickerel spawning in Madawaska River in late April and eggs hatch late May.

4.2.3 Baptiste Lake

The Normal Operating Zone, which includes the ideal water level, is the range in which most interests should be satisfied during the year and is shown in green on the diagram. The range has been developed through an

analysis of average water levels satisfactory to user groups and gauge readings experienced over the last seven years of operation.

The Operation Zone represents mid-range water levels both above and below the Normal Operating Zone in which inconvenience and minor damage can occur. Usually water levels in these ranges are of short duration, except during prolonged wet or dry periods.

The High Water Level Zone/Low Water Level Zone represents extremes of the water level range. These are above and below the Operating Zone, respectively. Water levels in the High Water Level Zone usually occur only at the peak of an abnormally high spring run-off or following an extremely large summer rainfall period and are of short duration.

Fisheries Checkpoints

- Lake Trout - fall drawdown to 7.30 and go no lower than 6.50 till March 15
- Walleye/Muskie - restrict drawdown from April 15 to mid July no less than one foot, then maintain to Sept. 1st.

Operating Plan Checkpoints

- January 1 freeze up 7.50
- March 15 drawdown (6.50 - 7.00), dependent on snow level, moisture content and general weather forecast
- May 1 high water level zone 8.50
- July 15 summer optimum operating level 7.80
- Fall Lake Trout spawning consideration 7.30

4.2.4 Opeongo Lake Dam

This structure is a three gate, 14-foot sluiceway.

The operating plan is as follows;

- Five logs are used to maintain the summer desired level is 94.5 ft
- The top tier of logs is pulled after Labour Day.
- Logs are replaced in the spring following freshet.

The major contact groups are;

- Ontario Parks;
    - 160 + interior campsites
    - major access point to Algonquin Park interior
    - store/outfitter/Marine taxi
    - Nature Reserves/Protected Areas
    - Major wetlands, Hailstorm Creek, Costello Creek, Jones Bay
- MNR Harkness Laboratory of Fisheries Research – established in 1935

Figure 32
MNR Structures

Aylen Lake Dam

Galeairy Dam

Figure 33
MNR Structures

Opeongo Lake Dam

Baptiste Lake Dam

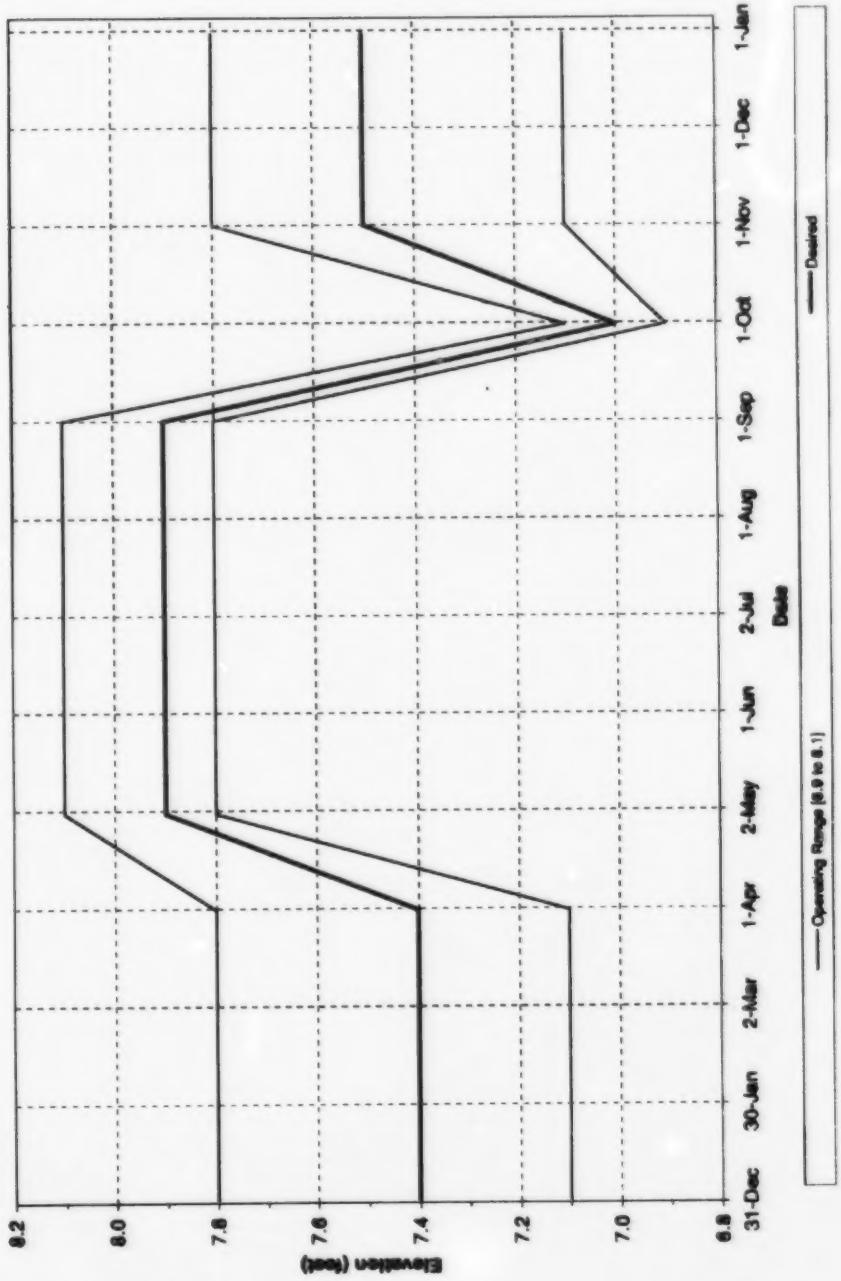


Figure 34
Aylen Lake Operating Band

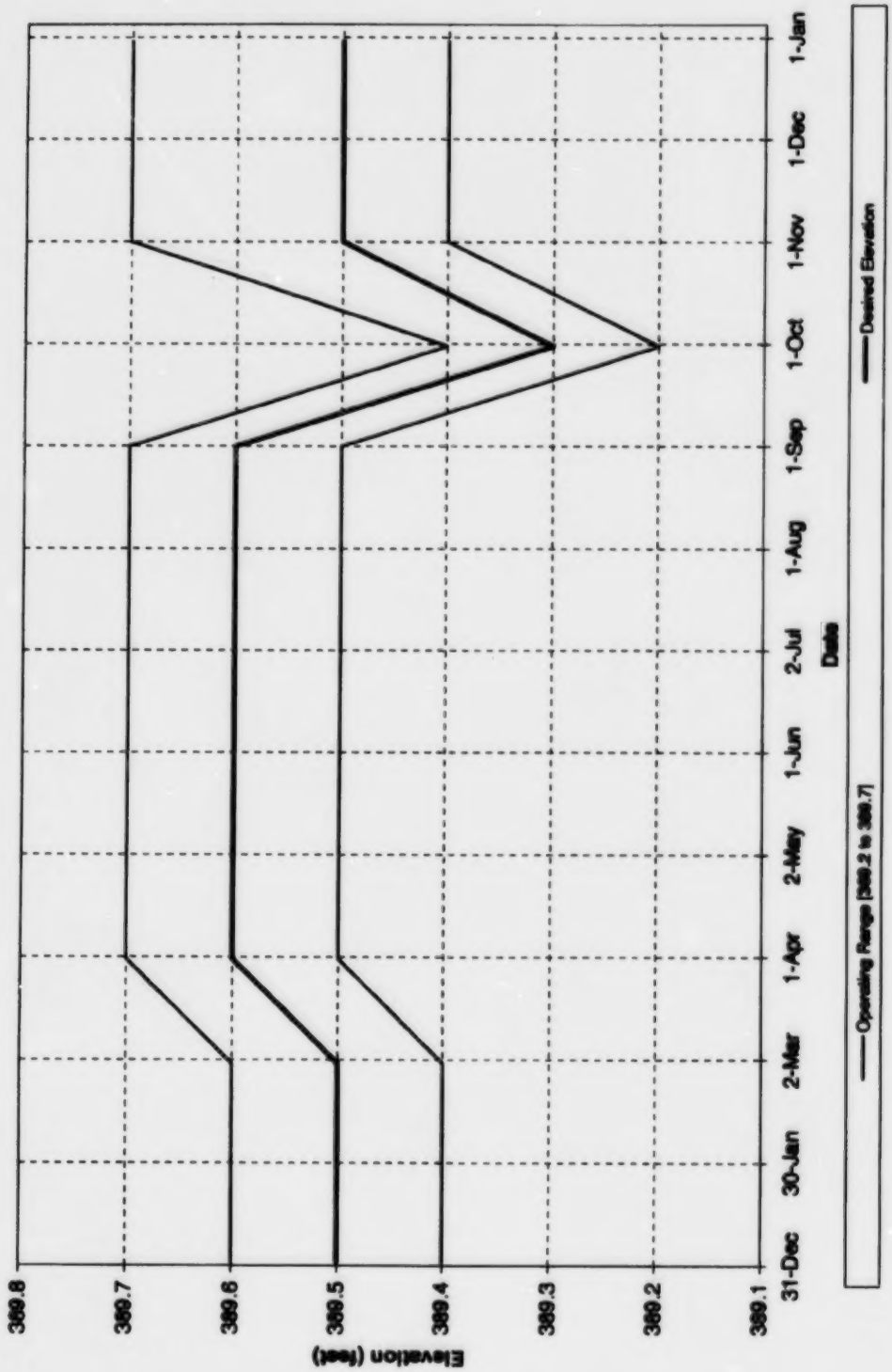


Figure 35
Galeairy Lake Operating Band

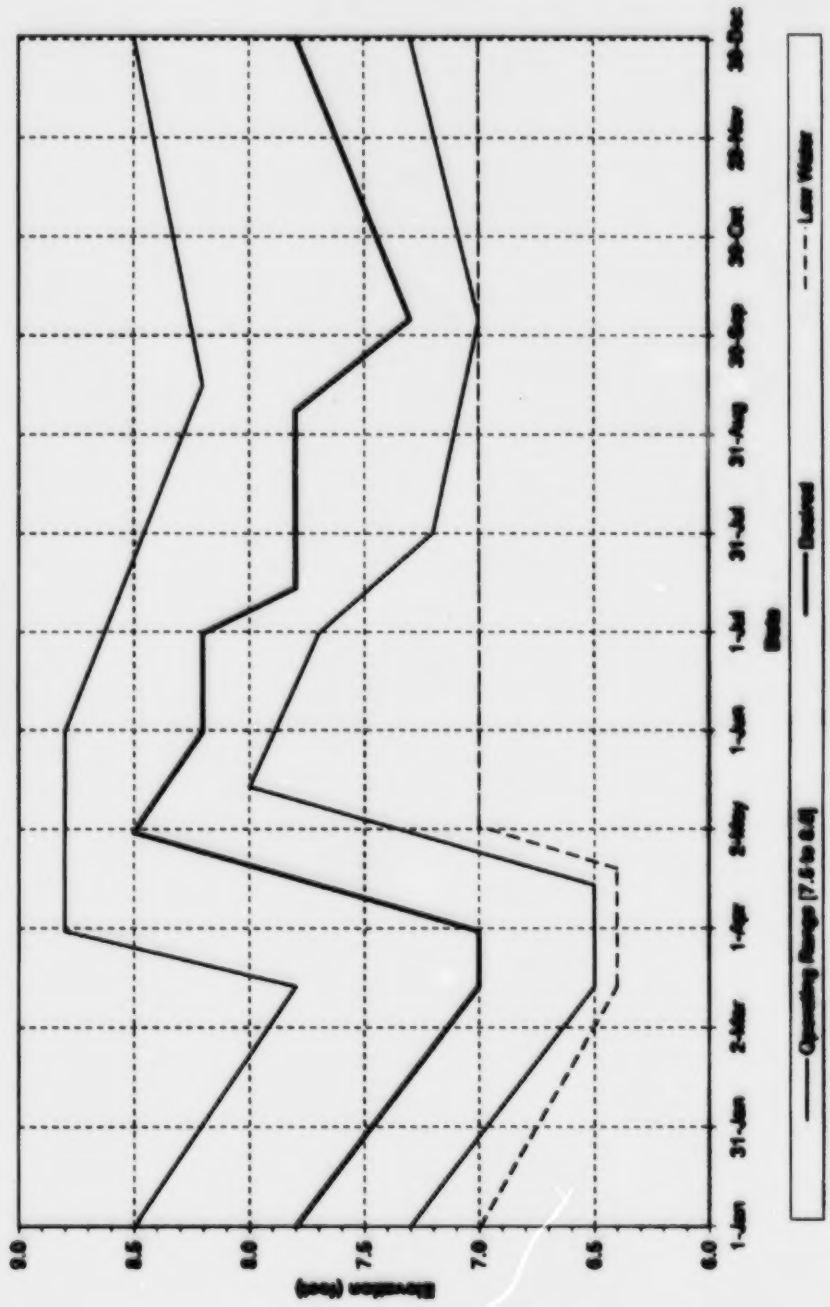


Figure 36
Baptiste Lake Operating Band

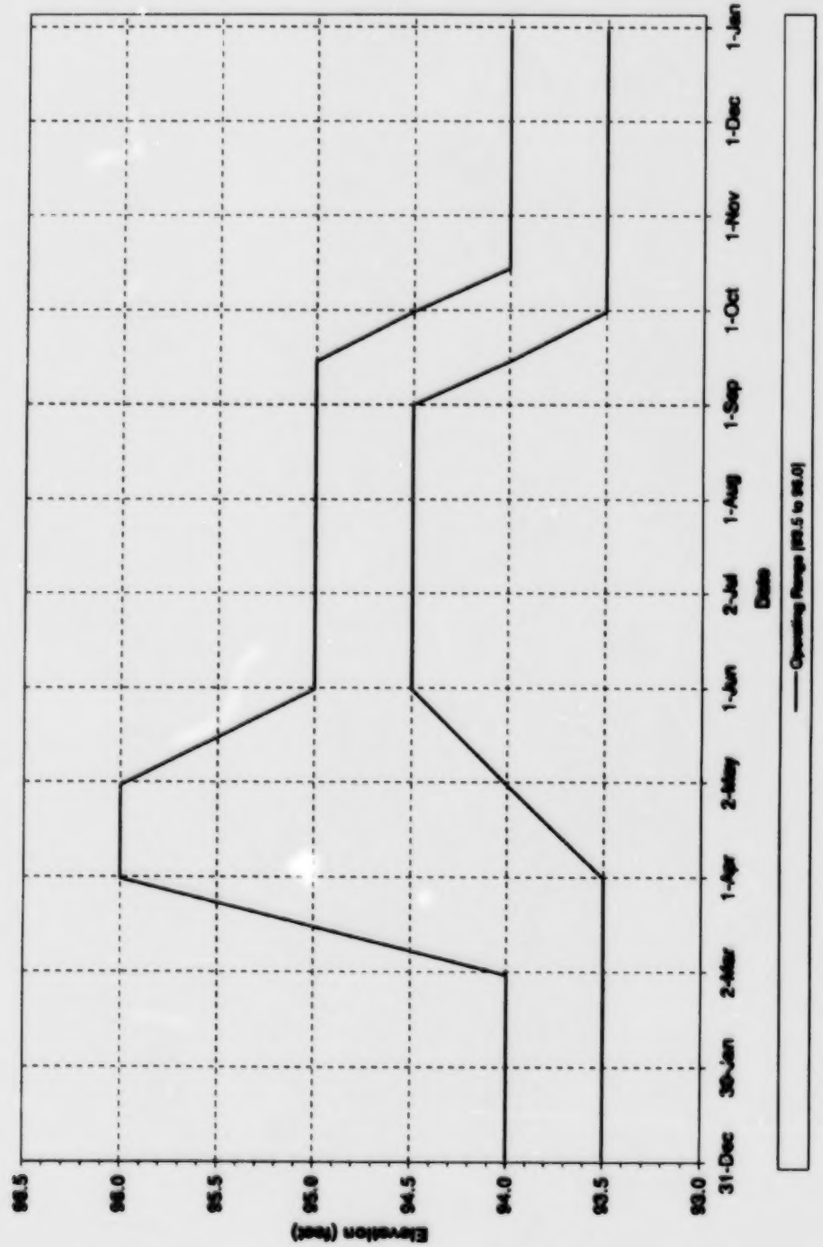


Figure 37
Opeongo Lake Operating Band

Other Considerations

- Spawning considerations during the fall and spring for naturally reproducing lake trout and bass
- Navigation through shallow narrows into the East arm

5.0 IMPLEMENTATION

Implementing the water management plan will be monitored by a Standing Advisory Committee. Terms of Reference are as follows.

5.1 Standing Advisory Committee-Terms of Reference

Introduction:
Ontario Power Generation (OPG) and the Ministry of Natural Resources (MNR) have cooperated to optimize and balance the water levels and flows of the Madawaska River and its headwaters for the benefit of fish and wildlife resources, power production, recreation and flood control. Since 1997, by means of public consultation and the advice and guidance of a Public Advisory Committee, a new operating plan for the Madawaska River and a document detailing the Problems, Issues and Concerns brought forward by the public have been produced. The Public Advisory Committee (PAC) has recommended that a Standing Advisory Committee (SAC) be established to advise, monitor and assist in the implementation of the Madawaska River Water Management Plan. The SAC would be composed of a number of citizens representing a diversity of interests along the course of the river, some of whom might be members of the existing PAC. OPG and the MNR have committed to this course of action.

Mandate:
The Standing Advisory Committee will provide a mechanism for the public to contribute to the implementation of the water management plan, follow the progress of the plan's implementation, and be aware of any issues or proposed changes to the plan. The formation of such a committee will not only enhance OPG and the MNR's ability to deliver the management responsibilities outlined in the plan, but also provide a communication link with the public to foster and maintain credible relationships. The members of the SAC will be broadly representative of the many and various interests and uses of the river throughout the entire watershed area. The SAC will report to the Madawaska Review Steering Committee, made up of senior management staff from OPG and the MNR. Final decisions on advice received from the SAC shall rest with the Steering Committee members whose organizations are legally responsible, in law, for the management of the water resource.

Roles:
The Standing Advisory Committee will perform the following activities:

- Review and advise on matters relating to the implementation of the Madawaska River Water Management Plan including:
    a) reviewing and recording all issues raised relating to the implementation of the Madawaska River Water Management Plan
    b) advising OPG and the MNR on appropriate solutions to specific water-related issues in the watershed;
    c) reviewing all data collected during the monitoring of the plan;
    d) advising on all proposed minor amendments to the plan;
    e) advising on all proposed major amendments received by OPG and the MNR, as to whether they should be incorporated in the plan and under what terms of public consultation, or if the application should be considered at the next public review of the plan.
- Facilitate the partnership of groups, agencies, organizations, clubs or individuals with OPG and the MNR to assist in implementing the water management plan;
- The Standing Advisory Committee will monitor the implementation of the plan and produce an annual status report in January of each year to be distributed to OPG and MNR;
- OPG and MNR will each develop a process to log communications from the public regarding water level and flow issues that will be available for the Standing Advisory Committee to review, as part of their roles and responsibilities;
- Assist OPG and the MNR in implementing communications and consultation by:

f) seeking to ensure the participation of all interested parties (the general public and interest groups) in any consultation process;
g) jointly hosting formal public consultation sessions with OPG and the MNR;
h) reviewing written requests from the public for changes to the plan and advising whether any such requests warrant a public review of the water management plan.

Composition:
The Standing Advisory Committee shall be composed of no more than 9 persons and no fewer than 6. Members of the advisory committee shall be selected by OPG and MNR. They will be assisted by up to two members of the PAC selected by the other PAC members.

Member selection will be based on:
a) the knowledge and perspectives they can provide, rather than representing a specific constituency;
b) ensuring a diversity of perspectives or interests are represented, including fishing, recreation, cottagers, boating, tourism, conservation, protection, business, and municipal government, among others;
c) ensuring that citizen representation covers the entire watershed and that those chosen have a knowledge of the entire Madawaska River basin;
d) the majority of the members live and work in the Madawaska River basin geographic area;
e) demonstrated ability to work with other groups or organizations to form effective partnerships;
f) demonstrated ability to work with others in resolving issues.

To foster vitality and renewal, Committee members may hold their position for no more than three consecutive two-year terms. The terms will commence on January 1st, of a given year. For the sake of continuity, no more than 3-4 members should turn over in a given year. Selection of replacement committee members will follow the process outlined above.

Administration:
The following administrative rules shall apply to the functions of the Committee:
- The members shall select a Chair, a Vice-Chair and a Secretary who will be selected on an annual basis, and their terms may be extended by members.
- The members may establish an alternate person to represent them in their absence, but each member cannot miss more than one meeting per year.
- The members will be reimbursed for reasonable expenses, such as travel and meals.
- Meetings will be held at the direction of the Chair, to a minimum of two meetings and a maximum of four per year. Additional meetings may be scheduled with the agreement of all members or as requested by OPG and/or MNR.
- The Chair shall be responsible for ensuring adequate notice to members of upcoming meetings, meeting agendas, and the overall conduct of meetings.
- In the absence of the Chair, the Vice-Chair shall assume the responsibilities of the Chair.
- Representatives from OPG and the MNR will be assigned to the Committee and will act in an advisory, facilitating and liaison capacity to the Committee.
- The Committee Chair shall be responsible for preparing meeting agendas, placing items on the agenda at the request of committee members.
- OPG and the MNR shall provide secretarial support to the SAC. The secretary shall record Minutes of each meeting, including key discussion points and action items, if any, and distribute them to the SAC.
- The Minutes shall be reviewed and approved by the SAC and available for public review.
- Recommendations of the SAC shall be arrived at by consensus decision-making. Where consensus is not achieved, majority and minority viewpoints will be noted.
- Recommendations of the SAC will be submitted to the OPG and MNR representatives, and a decision on the recommendations will be made by the OPG Ottawa-St. Lawrence Plant Group Manager and the MNR Pembroke District Manager. A decision summary will be provided to the committee, including written descriptions of where and why they agree or disagree with the recommendations of the SAC.

- Meetings shall generally be open to the public, although the Committee shall have the right to meet in-camera where matters to be considered need to protect the privacy rights of individual(s).
- Meetings are working sessions; members of the public may observe the sessions and may make scheduled presentations if submitted to the Chair at least 10 days prior to the agenda being set for the next meeting, and SAC members notified.
- Other OPG and MNR staff may attend portions of committee meetings in the capacity of advisory or resource persons, and may provide the committee with data and information on matters related to the review through presentations and upon members' request.
- OPG and MNR will provide orientation training for the members of the Standing Advisory Committee.

Selection Process:
SAC members will be selected by OPG and the MNR. These will invite the public through advertisements and letters of invitation to submit an application of interest or a nomination. Applicants will be selected based on the criteria outlined previously, and an interview.

Location of Meetings:
SAC meetings will be held in different locations within the Madawaska River valley to allow greater public access to the meetings.

Appendix 6.1

Terms of Reference - Madawaska River Water Management Review

Background

The Ontario Ministry of Natural Resources (MNR) and Ontario Hydro (since April 1, 1999 Ontario Power Generation, OPG)) have agreed to conduct a review of water management on the Madawaska River. The background and rationale for the review were discussed by both organizations at a July 21, 1995 meeting held in Toronto on "Management of the Madawaska River Watershed."

The people of Ontario rely on the Madawaska for its natural resources and its hydroelectric potential. Ontario Power Generation's activities are governed by Licences of Occupation and Water Power Lease Agreements administered by the Ministry of Natural Resources. Ontario Power Generation has made substantial investments on the river on the basis of these existing documents. Day-to-day operations of these structures are the responsibility of Ontario Power Generation. The Madawaska River generating stations are designed to be operated during peak energy demands in the province.

MNR and OPG have cooperatively changed the operation of the Madawaska River to address conservation concerns, as problems and issues have arisen over the years. MNR operates numerous small dams, primarily in the upper reaches of the watershed and manages them to maintain and protect recreational and natural features. Ontario Power Generation is a major user of the water resource on the river, and has a significant economic stake in its operations. OPG operates the larger control structures on the main body of the river. The public at large and stakeholder groups are also important users and have roles to play in reviewing and managing the river's operations.

The review is a significant step for several reasons:

1. It aims to apply several developing concepts of interest to both organizations: sustainable development, water(shed) management planning, and an ecosystem approach to management;
2. It involves water planning on the entire Madawaska River drainage basin (i.e. water management on a watershed basis);
3. It involves public information and participation as a key element of water management planning;
4. It strives to develop management approaches that are cost-effective, building on experiences elsewhere in the province.
5. It will improve communication and cooperation between water management operations of MNR and OPG.

Goal

To develop an inter-agency water management plan for the Madawaska River and to communicate it to the public.

Objectives

1. Review existing water management by OPG and MNR, from an ecosystem, watershed and resource use perspective.
2. Provide long-term opportunities for broad public involvement in the river's management.
3. Build towards a comprehensive water management plan for the river.

Guiding Principles for the Review

1. Current and future operations must adhere to present licensing and regulatory requirements and build on existing operational practices (under extreme natural conditions it may not be possible to operate within normal limits).
2. OPG has involved several stakeholder groups in developing the present water management plan for the river. Once reviewed, this plan can form the basis for a more comprehensive water management plan.
3. Identification of options must be a comprehensive and cost-effective exercise.
4. Internal and external communications are integral parts of this review and will be coordinated between the organizations.
5. MNR and OPG will commit to sharing the costs and applying the necessary resources to implement the outcome of the plan.

Roles and Responsibilities

Staff from the following organizations will have either primary involvement as operational members of the Working Group, or in an advisory capacity on the Steering Committee. Task groups will be formed to deal with specific components or action items of the review. Experts and other agencies (e.g. DFO and MOE) will be invited to participate and contribute to the Working Group's review as necessary.

The Working Group is responsible for seeing that all tasks are completed to meet the objectives of the review. The Steering Committee is responsible for reviewing phases of the work to be completed, ensuring the work is meeting the goals of the review, and seeing to the implementation of the review's recommendations.

Membership

Working Group

Ministry of Natural Resources
Ron Spurr (Co-Chair), Information Management Supervisor
John Boos, Madawaska Area Biologist
Nick Paroschy, Project Engineer, Southcentral Region
Henry Chayko, Area Technician, Algonquin Provincial Park
Tom Smith, Administrative Supervisor, Algonquin Provincial Park
Brian Vermeersch, Bancroft Area Supervisor

Ontario Power Generation
Robert Vinski (Co-Chair), Water Resources Engineer
Jin Whyte, Group Leader Operations & Plant Support, Ottawa/St. Lawrence Plant Group
Greg Pope, Senior Environmental Advisor, Electrical Production
Linda Halliday, Public Affairs Officer, Ottawa/St. Lawrence Plant Group
Don Ferko, Water Resources Engineer

Steering Committee

Ministry of Natural; Resources
Ray Bonenberg, Pembroke District Manager
Mike Bohm, Madawaska Area Supervisor

Ontario Power Generation
Joan Eaton, Manager Water Resources Division
John Tammadge, Manager, Ottawa/St. Lawrence Plant Group

Fisheries and Oceans Canada
Dan Thompson, Fish Habitat Biologist

Ministry of the Environment
Victor Castro, Evaluator, Technical Support Section

MNR and OPG staff will alternate as Chairs for the Working Group.

The Working Group will meet as necessary to complete the review to meet the deadline set by the Steering Committee.

Minutes of all meetings will be taken. Draft minutes will be circulated to Working Group members and the Steering Committee for review at the next meeting. If the Working Group cannot reach consensus on a particular item, the Steering Committee will be asked to resolve the issue.

Items discussed by the Working Group that have effects outside the Madawaska River, or set precedents for other watersheds will be directed to the Steering Committee.

Steering Committee

The Steering Committee will meet when necessary to review phases of the project, and will establish their own ground rules when they meet.

The Steering Committee approves the Terms of Reference, work plans, and communications plans. The Steering Committee sets deadlines, ensures activities are being carried out, and provides liaison with political entities.

Appendix 6.2

Terms of Reference for the Public Advisory Committee

Introduction

The Ministry of Natural Resources (MNR) and Ontario Power Generation (OPG) are undertaking a review of the water management on the Madawaska River. As part of this review, the two organizations will be communicating and consulting with the public in a number of ways. Under the auspices of the review, MNR and OPG have agreed to establish a public advisory committee (PAC).

Mandate

During the course of the review, the PAC shall provide advice to OPG and MNR, and enhance the process for communicating and consulting with the public. The advisory committee will assist and support the organizations to obtain a broad base of information and advice from the general public, and other entities that have an interest in the management of the river.

It is expected that the organizations' communications and consultation program will be enhanced by receiving information and advice from members of the PAC on various matters related to the review; and, having the PAC work with MNR/OPG in the administration of this program, thereby ensuring broad participation. The members of the PAC will represent a broad spectrum of interests from across the river's watershed. The advisory committee will report to the OPG and MNR Co-chairs of the review's working group.

As with any public input that is received during the review, final decisions on advice received from the PAC shall rest with organizations that have responsibility, in law, for the management of the natural resources of the river system and the dams present on it.

Roles

In reference to this mandate, the advisory committee will perform the following roles:

1. Review and advise on matters in relation to the development of a water management plan for the river (e.g. concerns; goals and objectives for the plan; aquatic resources; water flows, levels and fluctuations; current and alternative regulatory frameworks); and,

2. Assist MNR/OPG in implementing the communications and consultation plan by: seeking to ensure the participation of all interested parties (the general public, interests and interest groups) in the consultation process;

3. Jointly hosting, along with MNR/OPG, formal public consultation sessions;

    - Receiving and recording input from these parties; and,
    - Reviewing and advising on the comments received from the public and interest groups as a result of the public consultation.

Composition

The advisory committee shall be composed of no more than 12 persons, and no less than 10.

Members of the advisory committee shall be appointed by MNR/OPG on the basis of: a demonstrated understanding of the problems and issues that have precipitated this review; and,
Ensuring representation from the public-at-large, and a range of interests and public interests groups and from across the watershed.

Members shall be appointed by the review's steering committee for a term of two years, and these terms may be extended if necessary.

Administration

1. The members shall select a chair and a vice-chair.
2. The members may establish an alternate person to represent them in their absence.
3. The members will be reimbursed for reasonable expenses, such as travel and meals.
4. Meetings will be held at the direction of the chair, to a maximum of ten per year.
5. The chair shall be responsible for ensuring adequate notice to members of upcoming meetings, meeting agendas, and the overall conduct of meetings.
6. In the absence of the chair, the vice-chair shall assume the responsibilities of the chair.
7. MNR/OPG shall provide secretarial support to the PAC. The secretary shall record minutes of each meeting, including key discussion points and action items, if any.
8. The minutes shall be available for public review.
9. Recommendations of the PAC shall be arrived at by consensus decision-making. Where consensus is not achieved, majority and minority viewpoints will be noted.
10. Meetings shall generally be open to the public, although the committee shall have the right to meet in-camera.
11. Meetings are working sessions; members of the public may participate by observation and by scheduling deputations prior to the agenda for the next meeting. MNR and OPG staff shall attend all portions of all meetings of the committee in the capacity of resource persons, and shall provide the committee with data and information on matters related to this review through presentations and upon members' requests

Appendix 6.3

Madawaska River Water Management Review
Planning/Public Advisory Committee/Public Consultation Schedule - Nov. 1998

Month/Year			
1997	Planning Steps	PAC	Public
April	Organizing for Planning - ex. -	Establish Public	
May	sequence and documents	Advisory Committee (PAC)	
June	to be presented to the PAC		
July			
August			
September	Preparation of materials	Meetings to educate members	Invitation to participate
October	for distribution in	advice on public consultation	
November	background info. phase		
December			
1998			
January		Host public review with	Public review of
February		MNR/OPG	background information
March	Analysis of public and PAC		
April	input; Identiffication and	Review problems and issues	Incorporate problems and
May	evaluation of alternatives	document	issues identified by the
June			public into the document
July	Develop solutions document	Review solutions document	
August			
September			
October			
November	Prepare draft solutions	Continue review of solutions	
December	document	document	
1999			
January	Complete portions of final		Public review of draft
February	planning document	Assist with public	solutions document
March	Focus group and public open	Consultation	Public review of draft
April	house to review solutions document		solutions document
May	Finalize solutions document		
June		Review and advise on	Public review of background
July	Prepare draft plan	draft plan	information, problem and
August			issues solutions
September	Complete final draft plan		Public review of draft plan
October			
November	Approval and disrtibution of final		
December	plan		

Appendix 6.4

Problems and Issues Outside the terms of Reference Identified During the Public Consultation Process

Introduction

Through the public consultation process, a number of issues were raised that are not within the mandate of the Madawaska River Water Management Review Terms of Reference. The MNR/PPG Working Group decided that, although they could not deal with these issues, they were still important, especially to the members of the public who raised them. With this in mind, these problems and issues are listed here along with names, addresses, telephone numbers and procedures/processes that may be used/followed to try to resolve them.

Issue

1. Water Quality - Comments on water quality referred to evidence of pollution, garbage from river users (including ice fishermen), oil and gasoline from outboard motors, chlorine from water treatment plant, impact of snowmobiles, personal septic systems and water clarity.

Direction

Water quality is a primary responsibility of the Ontario Ministry of the Environment. They can be contacted at (613) 521-3450 in Ottawa. In addition, there is a "Spills in the Water Action Centre" for environmental spills reporting, which can be contacted at 1-800-268-6060. The Ontario Clean Water Agency can be reached at 1-800-667-6292. Residents and users of the Madawaska River are encouraged to educate people throwing garbage and debris into the water or leaving it on the ice. If there is a septic system problem, the Ministry of Health Public Health Laboratory can be contacted at (613) 736-6800 (Ottawa). If there is a fish kill or injury to fish as a result of pollution or a spill, the Ministry of Natural Resources (MNR) in Pembroke can be contacted at (613) 732-3661.

Fisheries and Oceans Canada can also be contacted at (905) 336-4688 (Burlington).

Issue

2. Prevention of littering.

Direction

Littering takes place both in the water and along the shoreline of the Madawaska River. It is extremely difficult to "police" an activity like this. It would seem that the best method to deal with this issue is through educating the public to be responsible and not throw litter in our environment. Posting of signs is cost prohibitive in that, historically, signs have been removed, damaged or destroyed.

Issue

3. Capacity for shoreline development.

Direction

Generally, density of development is governed through the provisions of a municipality's official plan and zoning by-law. The County of Renfrew is currently producing a county plan that will include all municipalities within Renfrew County. Any concerns about shoreline development issues should be directed to the Planning Director, County of Renfrew Planning Department, 9 International Drive, Pembroke, Ontario K8A 6W5 (613) 735-3204 or the Ministry of Municipal Affairs and Housing, Provincial Planning Services Branch, 777 Bay Street, 14th Floor, Toronto, Ontario M5G 2E5 (416) 585-6127 or the local municipal office.

Issue

4. Loss of riparian land rights along the forebays.

Direction

The first thing to determine is the ownership of the land along the forebays and who are the riparian landowners. In many cases, Ontario Power Generation (OPG) are the riparian owners. OPG has certain rights to flooding and drawdown along the Madawaska River.

Second, it would be necessary to determine what the "rights" are that are being lost. Ownership of the land by OPG should be readily easy and simple to determine from the records. More information will have to be gathered regarding the nature of the "rights" which are a concern. This can be determined through contacting those who participated in the focus group sessions and from the master mailing list.

Issue

5. Beaver impact on banks - this has been interpreted to refer to erosion created by beaver activity along the banks, specifically tree removal and burrowing into the bank.

Direction

Beaver are a natural part of the aquatic ecosystem.

First, it will be necessary for landowners to identify exactly where the erosion caused by beavers is occurring. There is provision to have a local representative from the Ontario Fur Managers Federation trap the beavers and remove them from the area. Private landowners are encouraged to allow trappers access to these locations.

Population control of these animals is the only way to deal with them adequately. Protecting trees can be done by wrapping the base of trees, along shorelines, with chicken wire. This is a technique that cottage associations often suggest to protect trees.

The MNR and OPG will be holding an erosion workshop within the next twelve months, to look at causes of erosion and methods to combat it. Some strategies might be developed from this session to help combat erosion caused by nuisance beavers.

Issue

6. Effect of large horsepower motors on erosion, wildlife habitat, swimmers and users of non-motorized and smaller watercraft.

Direction

The Boating Restriction Regulations are federal legislation governing the operation of boats on waterways in Canada. A variety of restrictions can be applied to a watercourse. Although none of the restrictions refer to motor size, there are prohibitions of all power-driven vessels from certain waters. There is also provision to set maximum speed limits on certain waters.

There is a blanket 10 km per hour speed limit for inland waters, within 30 m (100 ft.) of shoreline, except where posted otherwise (ex. – 9 km per hour or "No Wake" postings in narrow channels). The real challenge is the effective enforcement of these rules. It is the responsibility of the local police force, Ontario Provincial Police or Royal Canadian Mounted Police to enforce them. For more information contact Transport Canada, Place de Ville, Tower C, 21st Floor, Ottawa, Ontario K1A 0N5 (613) 990-2309.

Issue

7. A statutory framework should be implemented to replace the fifty-year regulations and voluntary guidelines pertaining to the Stewartville reach of the Madawaska River.

Direction

Currently, Ontario Power Generation has maximum and minimum water levels or ranges within which it operates its dams on the Madawaska River. The upper limits are mandatory and in place by statute through the provisions of Water Power Lease Agreements (WPLA) with the Province of Ontario, more specifically the Ministry of Natural Resources.

Issue

8. The lower water levels are voluntary

Direction

There is a concern that the present water management and changes proposed during the review will not be carried forward to new owners should Ontario Power Generation be privatized and the hydroelectric assets be sold.

The provisions of WPLAs are governed by Provincial legislation and statutes. Amending legislation and statutes is one method of ensuring adherence to water level minimums.

Appendix 6.5

Erosion Working Group - Terms of Reference

On behalf of the Hydroelectric Business Unit, the Erosion Working Group is hereby authorized to assess and make recommendations on erosion-related complaints and issues. These complaints and/or issues may have arisen due to the operation of Ontario Power Generation's hydroelectric facilities.

1. The name of the group shall be the "Erosion Working Group" or "EWG"

2. The Erosion Working Group shall consist of representatives from:

    - Water Resources Division (2 - property and water management functions)
    - Technical Services Division (2 - Civil Field Services and Environment Depts.)
    - Production Integration Division
    - Public Affairs Division
    - Law Division

Others, such as GRMD, Small Hydro, and Plant Group resource staff, may be called upon by the Working Group to contribute regarding specific issues.

3. The Production Integration Division representative shall be the Chair of the EWG.

4. The EWG will address complaints/issues in a manner which is fair and consistent, and conforms to Corporate policies and principles.

5. The EWG will follow a documented set of criteria to evaluate and dispose of all complaints. These criteria are attached to and form part of these Terms of Reference as Appendix III.

6. Accountability for assessing and recommending the appropriate action to take to resolve specific erosion issues will reside with the EWG. Recommendations could include a range of options such as: no action, erosion monitoring, acquisition of easements, operational constraints, erosion protection, or compensation.

7. The EWG will forward its recommendations and documentation for disposition of the claim to the Vice President - Hydroelectric.

8. The accountability for the decision regarding the disposition of the complaint rests with the Vice President - Hydroelectric

9. All documented complaints will receive a response in writing.

Erosion Working Group Procedures

1. The EWG meets monthly, on the afternoon of the first working Monday of the month.

2. The EWG has a Secretary with the responsibilities to:

    - develop agendas
    - develop and distribute appropriate notices and information
    - prepare response documentation to each complainant regarding the receipt and disposition of their complaint
    - record and distribute minutes of EWG meetings

The EWG deals with each documented complaint forwarded to it. Upon receipt of a complaint:

- each letter of complaint is acknowledged within one week of its receipt by the Chairman of the EWG
- the letter of complaint is circulated to the members of the EWG by the Secretary
- members of the EWG gather preliminary information regarding the case before the complaint is discussed by the entire EWG
- the letter of complaint is added to the agenda of the next regularly scheduled meeting of the EWG
- The complaint is recorded in the EWG database

4. The EWG assesses each complaint according to the "EWG Criteria & Constraints for the Evaluation of Erosion Complaints" (Appendix III).

5. The EWG makes recommendations to the Vice President - Hydroelectric for the disposition of the complaint

6. The EWG carries out its assessment and responds to the complainant in a timely manner.

Appendix 6.6

Fish and Game Clubs in Pembroke and Bancroft District

The following is a list of the fish and game clubs within the Madawaska River watershed, in the MNR Pembroke and Bancroft Districts. In order to find out if they participate in a "walleye watch" program or other fish and wildlife activity involving volunteers, the individual clubs should be contacted directly.

Pembroke District

Barry's Bay & Area Fish and Game Club
General Delivery
Round Lake, Ontario
K0J 2J0
Telephone: (613) 735-5588

Arnprior & District Fish & Game Club
P.O. Box 223
Arnprior, Ontario
K7S 1S7
Telephone: (613) 623-3255 (after 6:00 p.m.)

Calabogie Fish & Game Club
Box 717
Renfrew, Ontario
K7V 4H2
Telephone: (613) 432-4076

Eganville & District Sportsman's Club
Box 543
Eganville, Ontario
K0J 1T0
Telephone: (613) 649-2947

Madawaska Valley Fish & Game Club
Box 32
Quadeville, Ontario
K0J 2G0
Telephone: (613) 758-2098

Griffith/Matawatchan Fish & Game Club
C/o Ken Birkett
General Delivery
Griffith, Ontario
K0J 2R0
Telephone: (613) 432-4076

Bancroft District

Bancroft Fish & Game
Protective Association Inc.
Box 1677
Bancroft, Ontario
K0L 1C0
Telephone: (613) 332-4843

NOTE: *These telephone numbers are usually the home telephone numbers of club presidents and are subject to change when club presidents change.*

Appendix 6.7

Guiding Principles for CFIP and CWIP

When completing applications for CFIP and CWIP funding there are a few important considerations to keep in mind.

Projects must benefit the resource. Projects that protect and rehabilitate fish and wildlife populations and their habitats are a priority for the program. Provide information in your application regarding the resource benefits that you expect from your proposal.

Projects must benefit the public and not individuals or their properties.

Public involvement is necessary for project approval. The program will pay for materials necessary to implement a project. However, the applicant must provide the labour component of the project.

Projects should emphasize innovation, and involve a diversity of partners. Priority will be given to projects where the program funding is being applied as "seed money", with funding and resources from other sources being pooled for a common project. The idea is to encourage self-reliance of partners.

The maximum amount of money available for funding a project under either CFIP or CWIP is $5000.00.

MADAWASKA RIVER WATER MANAGEMENT REVIEW

CFIP/CWIP APPLICATION FORM

BUDGET YEARNAME OF GROUP

TYPE OF PROJECT .....GROUP CONTACT PERSON .....

CONTACT ADDRESS OF PHONE NO. .....

.....

PROJECT DETAILS

LOCATION OF PROJECT (name of waterbody, lot, concession, township).....

.....OWNERSHIP (crown or private).....

OWNER OR CROWN REPRESENTATIVE (print name) .....

SIGNATURE .....DATE .....
(This signature will be taken to be permission to proceed with work on the designated property)

BRIEF PROJECT DESCRIPTION (include a sketch of the proposed work on the back of this form)

.....

.....

.....

.....

HOW WILL THIS PROJECT BENEFIT FISH AND WILDLIFE RESOURCES? .....

.....

.....

HOW MANY VOLUNTEERS WILL BE INVOLVED: .....TOTAL COSTS OF PROJECT .....

HOW MUCH IS BEING REQUESTED FROM THE CFIP/CWIP PROGRAM? .....

WHO ARE THE OTHER PARTNERS, IF ANY, ON THIS PROJECT? .....

WHAT WILL THE PROGRAM MONEY BE USED FOR (number of tools, amount of rock, number of shrubs etc)?

.....

.....

.....

.....

SIGNATURE OF APPLICANT/CONTACT

PERSON.....DATE.....

ACCESS INSTRUCTIONS (how do you get to the project? – map or description)

SKETCH OF THE PROJECT (show approximate dimensions of habitat projects)

When will the project be undertaken (Spring, Summer, Fall, Winter)?

.....

Is this a multi-year project? If so, how many years?

.....

Appendix 6.8

Renfrew Country Stewardship Council

Deirdre Billes
Omagaki Wilderness Centre Tel: 732-0780

Walter Boswell Jr.
Arnprior Fish and Game Club Tel: 632-2686

Dr. Kim Clark
Algonquin College Forestry Program Tel: 735-4704, Fax: 735-4739

Mac Coughlin
Renfrew County Soil and Crop Improvement Association Tel: 646-7408

Tony Cowan
Forest Diversity / Community Survival Project Tel: 757-2717, Fax: 757-2717

Bob Dobson
Renfrew County Cattleman's Association Tel: 646-2488, Fax: 646-7142

Reeve Les Green
Chairman, County of Renfrew, Agriculture, Property and Environment Canada Tel: 628-5100

Brian Hamilton
Renfrew County Federation of Agriculture Tel: 646-2941, Fax: 646-7497

Shirley MacPherson
Ottawa Valley Tourist Association Tel: 756-2477, Fax: 756-2461

Jim Nugent
Pembroke Outdoor Sportsman's Club Tel: 732-1690

Fred Runge
Hurds Lake Cottage Association Tel: 432-3655

Michael Runtz
MacNamara Field Naturalists Tel: 623-9106

Jon Williams
Renfrew County Woodlot Owners Association Tel: 735-0048, Fax: 735-8176

Advisory Non-voting Reps

Glen Smith
Ag. Rep., Ontario Ministry of Agriculture, Food and Rural Affairs Tel: 432-4841, Fax: 432-5260

Mike Bohm
Madawaska Area Supervisor, Ministry of Natural Resources Tel: 732-5560, Fax: 732-2972

Stewardship Coordinator

Bruce Hood Tel: 732-5523; 638-2279 (home) Fax: 732-2972

Appendix 6.9

Policy Objective

NET GAIN OF HABITAT FOR CANADA'S FISHERIES RESOURCES
Increase the natural productive capacity of habitats for the nation's fisheries resources, to benefit present and future generations of Canadians.

The First Goal

FISH HABITAT CONSERVATION
Maintain the current productive capacity of fish habitats supporting Canada's fisheries resources, such that fish suitable for human consumption may be produced.

The Guiding Principle

NO NET LOSS OF THE PRODUCTIVE CAPACITY OF HABITAT

The Second Goal

FISH HABITAT RESTORATION
Rehabilitate the productive capacity of fish habitats in selected areas where economic or social benefits can be achieved through the fisheries resource.

The Third Goal

FISH HABITAT DEVELOPMENT
Improve and create fish habitats in selected areas where the production of fisheries resources can be increased for the social or economic benefit of Canadians.

IMPLEMENTATION STRATEGIES

1. **PROTECTION AND COMPLIANCE:** Protect fish habitats by administering the Fisheries Act and incorporating fish habitat protection requirements into land and water use activities.

2. **INTEGRATED RESOURCE PLANNING:** Participate in and encourage resource planning and management to incorporate fish habitat priorities into air, land and water use plans.

3. **SCIENTIFIC RESEARCH:** Conduct scientific research to provide the information and technology necessary for the conservation, restoration and development of fish habitats.

4. **PUBLIC CONSULTATION:** Consult the public on major or controversial fish habitat issues and the development of new policies and legislation for fish habitat management.

5. **PUBLIC INFORMATION AND EDUCATION:** Promote public awareness in the conservation, restoration and development of fish habitats.

6. COOPERATIVE ACTION: Encourage and support involvement by government agencies, public interest groups and the private section to conserve, restore and develop fish habitats.

7. HABITAT IMPROVEMENT: Initiate projects and provide advice to other interested groups to restore and develop fish habitats, in support of the net gain objective.

8. HABITAT MONITORING: Evaluate the effectiveness of decisions taken and techniques used to conserve, restore and develop fish habitats.

Appendix 6.10

Fisheries Act Section 20

(1) Every obstruction across or in any stream where the Minister determines it to be necessary for the public interest that a fish-pass should exist shall be provided by the owner or occupier with a durable and efficient fish-way or canal around the obstruction, which shall be maintained in a good and effective condition by the owner or occupier, in such place and of such form and capacity as will in the opinion of the Minister satisfactorily permit the free passage of fish through it.

(2) Where it is determined by the Minister in any case that the provision of an efficient fish-way or canal around the obstruction is not feasible, or that the spawning areas above the obstruction are destroyed, the Minister may require the owner or occupier of the obstruction to pay to him from time to time such sum or sums of money as he may require to construct, operate and maintain such complete fish hatchery establishment as will in his opinion meet the requirements for maintaining the annual return of migratory fish.

(3) The place, form and capacity of the fish-way or canal to be provided pursuant to subsection (1) must be approved by the Minister before construction thereof is begun and, immediately after the fish-way is completed and in operation, the owner or occupier of any obstruction shall make such changes and adjustments at his own cost as will in the opinion of the Minister be necessary for its efficient operation under actual working conditions.

(4) The owner or occupier of every fish-way or canal shall keep it open and unobstructed and shall keep it supplied with such sufficient quantity of water as the Minister considers necessary to enable the fish frequenting the waters in which the fish-way or canal is placed to pass through it during such times as are specified by any fishery officer, and, where leaks in a dam cause a fish-way therein to be inefficient, the Minister may require the owner or occupier of the dam to prevent the leaks there in R.S., c. F-14, s.20.

Fisheries Act Section 21

(1) The Minister may authorize the payment of one-half of the expense incurred by an owner or occupier in constructing and maintaining any fish-way or canal and, after a fish-way or canal that has been duly approved by the Minister has been built at the cost of the owner or occupier of any obstruction, or after the owner or occupier has paid one-half the cost thereof and the fish-way or canal thereafter proves to be ineffective, the total cost of any change in the fish-way or canal or any new fish-way or canal required to enable the fish to pass by the obstruction shall, except as provided in subsection 20(3), be paid by Her Majesty.

(2) The Minister, in order to procure the construction of any fish-way or canal, pending proceedings against any owner or occupier for the punishment imposed by this Act, may make and complete the construction forthwith, and may authorize any person to enter on the premises with the necessary workmen, means and materials for that purpose and may recover from the owner or occupier the whole expense so incurred by action in the name of Her Majesty.

(3) Where an unused obstruction or a thing detrimental to fish exists and the owner or occupier thereof does not after notice given by the Minister remove it, or if the owner is not resident in Canada, or his exact place of residence is unknown to the Minister, the Minister may, without being liable to damages, or in any way to indemnify the owner or occupier, cause the obstruction or thing detrimental to fish to be removed or destroyed and, where notice has been given to the owner or occupier, may recover from the owner or occupier the expense of the removal or destruction.

(4) The Minister may require the owner or occupier of any obstruction to install and maintain such fish stops or diverters, both above and below the obstruction, as will in his opinion be adequate to prevent the destruction of fish or to assist in providing for their ascent. R.S., c. F-14, s. 20.

Fisheries Act Section 22

(1) At every obstruction, where the Minister determines it to be necessary, the owner or occupier thereof shall, when required by the Minister, provide a sufficient flow of water over the spill-way or crest, with connecting sluices into the river below, to permit the safe and unimpeded descent of fish.

(2) The owner or occupier of any obstruction shall make such provision as the Minister determines to be necessary for the free passage of both ascending and descending migratory fish during the period of construction thereof.

(3) The owner or occupier of any obstruction shall permit the escape into the river-bed below the obstruction of such quantity of water, at all times, as will, in the opinion of the Minister, be sufficient for the safety of fish and for the flooding of the spawning grounds to such depth as will, in the opinion of the Minister, be necessary for the safety of the ova deposited thereon. R.S., c. F-14, s. 20.

Fisheries Act Section 27

No one shall

(a) damage or obstruct any fish-way or canal built, constructed or used to enable fish to pass over or around any obstruction;
(b) do anything to stop, impede or hinder fish from entering or passing the fish-way or canal or to stop, impede or hinder fish from surmounting any obstacle or leap; or(c) fish in any manner within twenty-five yards downstream from the lower entrance to any fish-way, canal, obstacle or leap. R.S., c. F-14, s. 25.

Fisheries Act Section 30

(1) Every water intake, ditch, channel or canal in Canada constructed or adapted for conducting water from any Canadian fisheries waters for irrigating, manufacturing, power generation, domestic or other purposes shall, if the Minister deems it necessary in the public interest, be provided at its entrance or intake with a fish guard or a screen, covering or netting so fixed as to prevent the passage of fish from any Canadian fisheries waters into the water intake, ditch, channel or canal.

(2) The fish guard, screen, covering or netting referred to in subsection (1) shall

(a) have meshes or holes of such dimensions as the Minister may prescribe; and
(b) be built and maintained by the owner or occupier of the water intake, ditch, channel or canal referred to in subsection (1), subject to the approval of the Minister or of such officer as the Minister may appoint to examine it. Duty of owner to keep in repair.

(3) The owner or occupier of the water intake, ditch, channel or canal referred to in subsection (1) shall maintain the fishguard, screen, covering or netting referred to in that subsection in a good and efficient state of repair and shall not permit its removal except for renewal or repair.

(4) During the time in which a renewal or repair referred to in subsection (1) is being effected, the sluice or gate at the intake or entrance of the water intake, ditch, channel or canal shall be closed in order to prevent the passage of fish into the water intake, ditch, channel or canal. R.S., c.F-14, s. 28; 1976-77, c. 35, s. 4.

Fisheries Act Section 32

No person shall destroy fish by any means other than fishing except as authorized by the Minister or under regulations made by the Governor in Council under this Act. R.S., c. F-14, s. 30; 1976-77, c. 35, s. 5.

Fisheries Act Section 35

(1) No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish

(2) No person contravenes subsection (1) by causing the alteration, disruption or destruction of fish habitat by any means or under any conditions authorized by the Minister or under regulations made by the Governor in Council under this Act. R.S., c. F-14, s. 31; R.S., c. 17(1st Supp.),s. 2; 1976-77, c. 35, s. 5.

Fisheries Act Section 36

(1) No one shall

(a) throw overboard ballast, coal ashes, stones or other prejudicial or deleterious substances in any river, harbour or roadstead, or in any water where fishing is carried on;
(b) leave or deposit or cause to be thrown, left or deposited, on the shore, beach or bank of any water or on the beach between high and low water mark, remains or offal of fish or of marine animals; or
(c) leave decayed or decaying fish in any net or other fishing apparatus.

(2) Remains or offal described in subsection (1) may be buried ashore, above high water mark.
(3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water

(4) No person contravenes subsection (3) by depositing or permitting the deposit in any water or place of

(a) waste or pollutant of a type, in a quantity and under conditions authorized by regulations applicable to that water or place made by the Governor in Council under any Act other than this Act; or
(b) a deleterious substance of a class, in a quantity or concentration and under conditions authorized by or pursuant to regulations applicable to that water or place or to any work or undertaking or class thereof, made by the Governor in Council under subsection (5)

(5) The Governor in Council may make regulations for the purpose of paragraph (4)(b) prescribing

(a) the deleterious substances or classes thereof authorized to be deposited notwithstanding subsection (3);
(b) the waters or places or classes thereof where any deleterious substances or classes thereof referred to in paragraph (a) are authorized to be deposited;
(c) the works or undertakings or classes thereof in the course or conduct of which any deleterious substances or classes thereof referred to in paragraph (a) are authorized to be deposited;

(d) the quantities or concentrations of any deleterious substances or classes thereof referred to in paragraph (a) that are authorized to be deposited;

(e) the conditions or circumstances under which and the requirements subject to which any deleterious substances or classes thereof referred to in paragraph (a) or any quantities or concentrations of those deleterious substances or classes thereof are authorized to be deposited in any waters or places or classes thereof referred to in paragraph (b) or in the course or conduct of any works or undertakings or classes thereof referred to in paragraph (c); and

(f) the persons who may authorize the deposit of any deleterious substances or classes thereof in the absence of any other authority, and the conditions or circumstances under which and requirements subject to which those persons may grant the authorization.

(6) A person authorized to deposit a deleterious substance by or under regulations made pursuant to subsection (5) shall, when directed in writing by the Minister, notwithstanding any regulations made pursuant to paragraph (5)(e) or any conditions set out in an authorization made pursuant to paragraph (5)(f), conduct such sampling, analyses, tests, measurements or monitoring, install or operate such equipment or comply with such procedures, and report such information, as may be required by the Minister in order to determine whether the person is depositing the deleterious substance in the manner authorized. R.S., c. F-14, s. 33; R.S., c. 17(1st Supp.), s. 3;1976-77, c. 35, s. 7; 1984, c. 40, s. 29.

Appendix 6.11

Environmental Registry Posting

EBR Registry Number: PB8E3003 Type of Posting: Policy Ministry: Natural Resources Status of Posting: Proposal Date Proposal Loaded: 1999/04/30 Comment Period: 75day(s).

Written submissions may be made between April 30 and July 15, 1999.

NOTICE OF PROPOSAL FOR POLICY

Proposal Title: Madawaska River Water Management Review - Invitation to Participate

Short Description:

The headwaters of the Madawaska River are located in the southeastern portion of Algonquin Provincial Park. The river travels 225 km (140 miles) southeast to its confluence with the Ottawa River at Arnprior. It drains a watershed in excess of 8500 sq. km. The river supports a range of aquatic ecosystems and human uses, among them swimming, canoeing, angling and tourism operations. There are also 12 Ministry of Natural Resources dams on the river, and seven Ontario Power Generation (OPG) dams. Five of the seven OPG dams are used to generate electricity. The dams and operation of the dams to meet peak daily demands for electricity have had an impact on the aquatic ecosystems and on other uses.

Purpose of the Proposal:

The Ministry of Natural Resources (MNR), working with Ontario Power Generation, intends to establish a comprehensive water management plan for the river that addresses problems, issues and solutions related to the river's flows, levels and aquatic resources, based upon principles of sustainable development.

For the purposes of this plan, sustainable development has been interpreted to mean a water management regime that results in the best possible balance among a range of natural heritage, social and economic values and uses for the benefit of present and future generations.

Other Relevant Information:

Additional contact (Ontario Power Generation)

Linda Halliday,
Public Affairs Officer,
Ottawa/St. Lawrence Plant Group
Ontario Power Generation
Box 999
Cornwall, ON K6H 5V1
Tel:(613) 932-3072, extension 3304
Fax:(613) 932-9981
E-mail: linda.halliday@ontariopowergeneration.com

Public Consultation:

A Public Advisory Committee (PAC), comprised of 11 area residents, was established in 1997 to provide advice to MNR and OPG, on the development of the plan, and to assist in the delivery of the public consultation program. Four formal phases of public consultation will be held:

1. Invitation to participate (January 1998) and public review of background information;

2. In consultation with the public and stakeholders, develop problems and issues document ; (throughout 1998 to winter of 1999)

3. Public review of management alternatives (solutions) (Spring 1999)

4. Public review of draft plan before final plan approval. (Fall 1999)

The agencies, along with the PAC, will, by invitation to interested individuals, host a focus group meeting on February 28, 1998 to help identify problems and issues that the plan needs to address. This will be followed by two public open houses on March 4 and March 25, 1998. Details about the results of the open houses may be obtained from the contacts noted below.

A mailing list was compiled from Phase I of the public consultation process.

Between June 1998 and February 1999, solutions were developed and endorsed by the Public Advisory Committee, MNR/OPG Working Group and MNR/OPG Steering Committee. These were presented for public review at a focus group meeting held on March 27, 1998 and public open house on April 9, 1999. One hundred and twelve people were invited to the focus group meeting. Each was sent a copy of the relevant information with their letter of invitation. As many as possible were contacted by telephone follow-up to determine who would be attending. The most recent version of the Problems, Issues and Solutions document and the Information Needs document were available. A 30-day review time was requested. Preliminary results of Phase II of the public consultation process were reviewed by the PAC and Working Group on April 21, 1999.

Comments should be directed to the following contact person:

Ron Spurr
Information Management Supervisor
Pembroke District Office, P.O. Box 220, 31 Riverside Drive
Pembroke, Ontario, K8A 6X4
PHONE: (613) 732-5510, FAX: (613) 732-2972
Email: ron.spurr@mnr.gov.on.ca

All comments on Problems, Issues and Solutions document will be considered as part of the decision-making by the Ministry if they:

(a) are submitted in writing;
(b) reference the EBR Registry number; and

are received by the contact person within the specified comment period.

Information on this document and other documents relating to the Madawaska River Water Management Review can be found at: www.ontariopowergeneration.com/Environment/Madawaska/MadRiverTOC

** No acknowledgement or individual response will be provided to those who comment. All comments & submissions received will become part of the public record. **

Appendix 6.12

Visitor Survey June - August 1997

Introduction

The Communications Plan for the Madawaska River Water Management Plan identified conducting a survey along the river to get input from seasonal users. Opportunities for input and participation in the planning process for seasonal users are often limited because many people are on vacation during the summer months and are not available to become involved. The Madawaska River is well known for its popularity for tourists during the summer months. In order to get some idea of the summer users, and what their comments and concerns might be, this survey was undertaken from the end of June to the end of August, 1997. The forms were completed by a surveyor at different locations along the Madawaska River. These are the results of the survey.

Procedure

1. Using as an example a questionnaire developed by the Ottawa Valley Tourist Association, a visitor questionnaire was developed for us on this project.

2. The project began at the end of June and continued to the end of August, 1997.

3. A total of 145 questionnaires were completed.

4. A total of 556 people were contacted.

5. Not all questionnaires were fully completed.

6. Many of the answers represent an entire group of people.

7. The survey was conducted at the following locations along the Madawaska River:

Arnprior Beach
Black Donald Lake
Frank's Place - Calabogie Lake
Sullivan's – Barry's Lake
Stevenson's - Kamaniskeg Lake
Carson Lake Provincial Park
Barkwick Camp
Bark Lake
Sunnyhill Resort
MKC (Madawaska Kanu Centre)
Burnstown Beach
Popkie's - Black Donald Lake
Fawn Ridge - Calabogie Lake
Sand Bay Camp - Kamaniskeg Lake
Opeongo Trail – Kamaniskeg Lake
Carson Lake Villa
All Star Resort
Pleasant Point Camp - Trout Lake
Red Deer Lodge - Bark Lake

Results

1. Origins of group:
The majority of responses indicated that most people were from Eastern Ontario (Ottawa, Kingston) and the Ottawa Valley (82). Thirty-two were from Southwestern Ontario (Toronto, Windsor), 13 were from Central Ontario (Barrie, Orillia) and 3 were from Quebec. There were 8 from the U.S.A., from Florida, Pennsylvania, New Jersey, New Hampshire, Connecticut, Philadelphia and Georgetown. There was 1 from Germany.

2. Age group:
The majority of the responses were under 16 years of age (151) followed closely by the age group 41 to 60 years (146). The third largest group is 26 to 40 years (130), followed by 61+ (55) and last 17 to 25 (36).

3. First visit to the Madawaska River Valley:
A total of 19 responded that this was their first visit to the Madawaska River valley.

4. What attracted people to the area:
See Response in Comments Section

5. Length of stay:
The responses to this question ranged from one day to one and a half months to all summer to three months to permanent resident. The most frequent length of stay indicated on the questionnaire was one week (33 responses), followed by the entire summer (28 responses), followed by two weeks (16 responses), followed by one day (15). (Included in "summer" were responses such as seasonal (1 response), whole season (5 responses), five months (1 response) and 6 months (3 responses)). There was 1 response indicating one and a half weeks, 6 responses indicating 3 weeks, 2 responses indicating 3 weeks and 7 responses indicating weekends. One response indicated 1 month, 2 responses indicated 2 months and one response indicated two and a half months. The remainder ranged from 2 days to 5 days.

6. Frequency of visit:
There were many different responses to this section. The majority of responses support once, with a total of 60. These included once, summer months/summer, every year, once for a whole season, once a season and one month at the end of the summer. Other responses included:

Twice - 3 responses
Three Times - 2 responses
Four Times - 1 response
Five Times - 2 responses
Six Times - 2 responses
Seven Times - 1 response
Once or Twice - 1 response
Two to Three Times - 1 response
Three or Four Times - 1 response
Six to Ten Times - 1 response
Ten Times - 1 response
As often as possible - 4 responses
Twice a Week - 3 responses
Every Two Months - 1 response
Weekly - 7 responses
Twice a Month - 1 response
Every Weekend - 13 responses
Every Two Weeks - 4 responses
Every Second Weekend - 2 responses
Every Second Weekend and Holidays - 1 response
Weekends and Holidays - 2 responses
Once a Year Every Weekend - 1 response
Every Couple of Weeks - 1 response
First Time - 1 response
Long Weekend - 1 response
Thirty Times - 1 response

Once a Month - 1 response
Once a Month or More - 1 response
Permanent Resident - 5 responses

7. Do you have a cottage here (own or rent) or are you a year-round resident:
Most responses were to the first part of the question. A total of 115 responses indicated that they rented. The correlation being if the majority of the people surveyed rented than they are probably not year-round residents. This gets confusing when applied to the next questions that indicated that most people did NOT use a cottage/resort accommodation facility. Only two responses indicated they owned a facility, presumably a cottage. Twenty-five responses indicated they were not year-round residents. Three responses indicated that they were year-round residents.

8. Type of accommodation used:
The majority of the responses (78) indicated they used a camp, trailer or motor home. Only 17 responses indicated they used a cottage or resort. Thirteen responses indicated a day trip. Four were visiting friends or relatives and one took advantage of a bed and breakfast facility.

9. Activities participated in:
The activity most participated in was swimming with 118 responses. The next was fishing, with 99 responses, followed by boating with 91 responses. Canoeing received 34 responses with other water sports receiving 21 responses. Visiting Algonquin Provincial Park received 22 responses. Cycling received 17 responses. Whitewater rafting/kayaking received 13 responses. Attending festivals/events tied with visiting another Provincial Park with 6 responses. Visiting a regional/municipal park received 3 responses and visiting a museum/natural display received 2 responses.

10. Opinion of river if participating in any water-related sports:
See Response in Comments Section.

11. How water levels and flows affected the quality of your recreational activities on the river:
See Response in Comments Section.

12. How much money do you intend to spend in the area:
The majority of the responses (106) indicated that they spent in excess of $500.00. Twelve responses indicated $100.00 to $500.00, 11 indicated they spent less than $25.00, 8 responded that they spent between $50.00 and $100.00 and 1 response was $25.00 to $50.00,

13. Planning to return to the Madawaska River Valley.
Of the 145 completed questionnaires, 8 had no response and 2 indicated they were uncertain. One hundred and thirty-five responded that they planned to return to the Madawaska River Valley. No one responded that they would not return.

SUMMARY OF COMMENTS

What attracted you to the Madawaska River Valley?

Used to live here/originally from the area
Live here/permanent resident on the Madawaska River
Good fishing (when you can catch them)
Good ramp (?)
Family/relatives

Only place to go swimming
Clean rivers
Live in area/from the area
Family originated from here
Beach
Nearby
Good swimming
Peaceful/quietness
Private
Water levels don't change
The lake/size of lake/clean lake
Like it/nice place
The people
The area/the space/the land/the location
Campsite/campground
Hunting
Boating
Beautiful scenery
Friends
The weather
Get out of the pollution
Close to trails and river, in the north
Polish area attracts them
Who knows?

Comments about state of river and quality of the experience:

Madawaska Kanu Centre

Palmer on Monday very low (broke paddle). Not adequate for instruction. The level has been good on Madawaska for gate work.

Beginning paddler - too small flow is alright. Must travel to other sites.

Big change in water, especially Palmer Rapids. Reduction in time allowance on the river. Making the best of it. Paying for water on Monday but it isn't here.
Disappointed about travel factor to water. Challenges because of low water. More water would help to avoid rocks.

Low water but temperature is good. Because of no water they have to travel and time limit because of water levels.

Rocky because of low water levels.

Water when releasing fine. Doesn't like the lack of flexibility for Monday and Friday.

Water fine when being released.

Monday, no access to water.

Hard not having water here on Monday's. Long weekend people expect water on Monday's. Loss of business.

Good. Found it challenging.

Past years, had 24 hour weekends. Important for paddlers in summer. Others are just spring. Good to have water at Palmer. Rafts are getting thin. Canoes and kayaks are fine.

The water - there's none. Guaranteed release gone. Injuries due to not enough water (stitches). Is it really 26 cms?

Sunny Hill Resort

Allowing water out on a dry year for white water rafting. On a dry year farmers have to lose their crops.

Problems with docking and watering area. Lousy fishing - patterns of feeding.

Bad fishing. No problem.
Bad swimming hole. Bad fishing.

Would have been better fishing had the water been high.

Way too much water was taken off in such a short time.

Problems with boat docking. Had to move. Problems physically with getting in and out of boats for elderly.

Pickerel came across as being the biggest topic. May - very high water levels. Can't put sailboat in. Mother nature and logic. Do better with Farmer's Almanac.

Pike present therefore no trout. Same with pickerel. Loon predator of trout. Poor luck fishing. Went fishing at dock for trout during stocking.

Haven't been yet.

Lowest it's ever been in many parts. Bothered that it never came back up.

No beach for swimming, limited access to docks, bad fishing (as always). Realizes it's flooded lands and there are agreements.

Riverland - Bark Lake

Safety hazard with low water levels. Fishing not good. No pickerel/bass. This year was the worst.

Low levels of concern. Fish jeopardized. Disrupting aquatic fauna and loon nesting.

Very low water levels.

Water levels low and keeps going down. Boat docks a problem.

Good clear water.

Water is way too low. More stocking. No wake sign. Problem with docking. Taking off even at low levels.

Lower than normal but not affecting individual.
Bad water levels. Down 2 feet. Fishing bad. Can't get to key areas.
Terribly low water levels. Ontario Hydro out of control.

Hard to access key areas. Hazardous due to low levels. Shallow areas could be marked.

Water is down. What about closing stocked lake. Water in 29 years has never been this bad. Vagrant camping on Crown property. Messy. Next to old Bark Lake campsite. Decent sign and more policing.

Down four and a half feet from last year. Lost boat propeller along with others.

Low levels.

Low water. Got stuck.

Red Deer Lodge - Bark Lake

Relaxing.

Low levels. No fish.

Not good fishing. Low water levels cause propeller breakage.

Low.

Bit low.

Pleasure Point Camp - Trout Lake

Seems low. Fine otherwise.

All Star Resort

Low docks are good but the water low. Wildlife is good. Happy with trout. Want pickerel.

More consistent water levels with more *(water)* where they are. Will the flushing occur in the future? Water is still good but dropping level is injurious to the fish. Neglected to the west (Bark Lake - Whitney).

Low water impedes boating. No fish. What about their spawn?

Barkwick

Nice. Like it.

Water levels have limited skiing. Angry against MKC. Don't manage part time.

Fish habitat and wildlife from the draw down. Level of water for boat not safe.

Carson Lake Villa

Low compared to past years.

Lots of rocks. Good fishing.

Carson Lake Provincial Park

Not too bad.

Water level high.

Fine.

Clean. Need more stocking. Not enough stocking.

No complaints.

Calm.

Water's nice.

Opeongo Trail - Kamaniskeg Lake

Clean in spring time. Flow fast and high.

No fishing. No good.

Fishing not great. Makes you lose interest.

Poor fishing. Good water boating. No ice fishery.

Water levels stable.

Satisfied.

Fishing not too bad.

Fish not bad (bass and pike). Low as compared to previous year.

There are fish present.

Sand Bay Camp - Kamaniskeg Lake

Ice fishing limited. Slot limit in winter only - done in other districts (Belleville). Not in summer because of temperature differences. Policing, Stocking. Ecology of lakes affected by flow output.

Limits, policing.

Fish hatcheries, stocking, outdoors cards. Ice fishing hurting numbers. Get limit and season limit.

Satisfied.

No complaints. More fish.

Fishing not as good as it used to be. Pressures and limit numbers. Low levels at times make it difficult to launch a boat. No slot limit (not for any lakes) but yes in winter and limit season.

Water levels cause erosion and erode trees.

Kamaniskeg is a nice lake. Expect fluctuation. Sometimes low, can't put boat in. More water in fall for hunting. More fish. Sports outdoor card.

Fishing in area is disappointing (trout). Water level stable.

Good experience. More fish.

Pine Cliff - Kamaniskeg Lake

Water levels okay but could be lowered - erosion. Speed levels need to be monitored.

Erosion from winter levels and boat speeds.

Pickerel.

Fluctuates. Really notice the current when swimming.

Sniders - Griffith

Fine.

Levels are high this year. Average fishing.

This year fluctuation has been a bit better but they tend to play with it around the spring.

Fishing good. Water levels alright.

Fine.

This year the water level is fine. Every Tuesday water levels drop three inches. Fishing is better in the area than in the past, especially the last two years as to five years ago.
Constant water levels but high.

Sullivan's - Barryvale

More consistent as compared to previous years. Not good fishing.

Not the fish there used to be. Levels more constant. Clean.

Good.

Fawn Ridge - Calabogie

Water clean.

Frank's Place - Calabogie

Fluctuation in the past. Boat access.

Better this year.

Happy with everything.

Not a lot of fishing.

Water levels good, not as good in spring.

Popkie's - Black Donald Lake

Better fishing. Just have to work for it.

Excellent.

High this year, water levels.

Don't like the way they drop the water in the spring.

Fluctuate water. Morning and night.

Beautiful. Clean.

Fishing not very good this year. Affected spawning by water.

Good fish. Some small. Raise up water then take it right down two days later.

Fluctuates a lot, not a problem.

Better eye on people taking small fish, washing with shampoo.
No, no problems. Fishing terrible.

Black Donald Lake

Fluctuates too much. Bass population increasing. This year perfect. Fishing reasonable but not the same quantities.

Clean. Some fluctuation. Not a problem. Not a lot of luck fishing.

Perfect.

The year they drew it down, they ruined the fish. No small mouth bass. But there is more fishing.

High, clean.

Water is too high for fishing. Lots of debris.

Fishing is bad.

Great. Sometimes low levels.

Great. Clean.

Burnstown Beach

Fine.

Cleaner than Rideau.

Clean.

Very nice, quiet, water is in good shape.

Clean. High water usage. A lot of traffic.

Good.

Not as many fish.

Cleaner than Arnprior. Flow too heavy. The two trestles interfere with swimming. Don't like the kind of fish there.

Great.

Good, clean.

No, haven't been in the water yet.

Height fluctuates.

Beautiful.

Clear.

Clean.

Arnprior Beach

Good. Not enough fish. Rocks don't show on charts.

High water in spring.

West end of river not as clean.

Clean, very pleased with the state of the river. No noticeable problems.

Not as good as it was a few years ago.

Comments on how the flows and levels affected the quality of recreational activities on the river:

Madawaska Kanu Centre

It is the same amount as in past year.

Sunny Hill Resort

Bass here need water for spawn, too. Injuries from boat to dock.

Widening of spawning beds would benefit for downstream. Establishing spawning beds for natural reproduction.

Are walleye more important downstream?

Terms of reference important. Local fish impacted and disadvantaged. Came across as fish (pickerel) further downstream more important. Analyze objectives. Article in Citizen about loon being endangered. Dropping of water disturbing nesting.

Pickerel healthier, the lake trout good. Fluctuation - pickerel would survive better.

All Star Resort

Putting in lake trout to provide fishing is useless. Close winter fishing. Stocking not the answer. Waste of money. Get something that is self sustaining. Creel samples. Net trapping. Overestimation of flooding waters.

Concerned low levels will affect wildlife (loons). No beaver. No moose.

Barkwick

Water management for the majority, not minority. Props broken.

Sullivan's - Barry vale

Doesn't go out as much. Netting from year ago.

Popkie's - Black Donald Lake

Kills fish. Depletes stocks for years to come.

Black Donald Lake

Get to know where rocks are.

Burnstown Beach

Big draw. Two feet in a day. Strong current, bent dock, almost lost boat. Not public enough. Only one radio station - Y105.

Arnprior beach flow too heavy, ramp taken away and now washes sand away.

Arnprior Beach

Affects spawning.

This is usual and part of nature. Nothing can be done about it.

Appendix 6.13

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7.0 Glossary of Terms

Term	Definition
Active Storage	The volume of water contained between the maximum and minimum operating level within a reservoir.
Backwater Effects	An increase in water level caused by a downstream obstruction.
Base Load	The minimum continuous amount of power required over a long period of time (minimum of one month).
Benthic	The region of the shore and the bottom of waters, benthic (as noun) or benthic zone (Gr. *benthos* depth).
Capacity	The greatest load which a unit, station or system can supply. Capacity is usually measured in kilowatts, megawatts, etc.
Channel	A long, deep portion of a river or other waterway through which water and sediment flow.
Compensation Water	That fraction of stream flow released through a hydroelectric dam specifically to meet the needs of downstream users.
Dam (noun)	A structure built as a barrier to the flow of a stream or river.
Demand	In the electrical industry, "demand" is often used synonymously with "power" which is the rate at which electric energy is delivered at a given instant or averaged over some designated period of time. It is expressed in kilowatts, megawatts, etc.
Drainage Basin	The area of land over which all runoff flows into the same river.
Drawdown	The difference between maximum and minimum water levels in a reservoir. Also refers to the act of lowering reservoir levels.
Drawdown Zone	Reservoir regions alternately exposed and submerged due to water level fluctuations.
Ecology	The study of the relationships of organisms to their environment (Gr. *eikos* house, *logos* discourse).
Emergy Emergency	The Independent MArket Operator (IMO) has the responsibility for the stability of Ontario's electrical system to • Match generation to load • Maintain the frequency/Voltage quality • Ensure sufficient operating reserve for generation loss protection • Prevent load cuts where parts of the electrical grid are not supplied with power Voluntary constraints may be exceeed in order to fulfill above obligations

Epilimnion	The turbulent superficial layer of a lake or reservoir lying above the metalimnion which does not have a permanent thermal stratification. (Gr. *epi* on, *limne* lake).
Eutrophic	Waters with a good supply of nutrients and hence a rich organic production (Gr. *eu* well, *trophein* to nourish).
Flood	A natural and generally short-term rise of a stream or river above it's normal level resulting from rainfall or snowmelt.
Flood Frequency Curve	A graph of annual flood peaks usually ranked in descending order and their frequency of exceedence. The graph may be interpreted as the probability of a certain discharge occurring in a given year. The annual flood frequency curve describes a sample of peak annual events only and is often misinterpreted as representing all floods.
Flow Regime	A range of possible flow levels or conditions in a watercourse.
Full Supply Level	Same as operating maximum water level.
Head	The difference in elevation between water levels upstream and downstream of a dam.
Headwater	The section of a river or stream with the highest elevation above sea level.
Hypolimnion	The deep layer of a lake lying below the metalimnion and removed from surface influences. (Gr. *hypo* under, *limne* lake).
Laminar Flow	The organized unidirectional movement of a liquid or a gas (Lat. *lamina* leaf, thin layer).
Littoral	Shallow zone of a lake or river in which light penetrates to the bottom permitting plant growth.
Littoral	The shoreward region of a body of water (Lat. *littus*, prop. *litus* shore). Low Flow The periodic decline in a river's water level as a result of reduced precipitation.
Macrophytes	Large plants (Gr. *makros* great, *phyton* plant).
Mainstem	The unimpeded, main channel of a river.
Maximum Operating Level	The highest level to which water in a reservoir can rise under normal operating conditions.
Maximum Usable Flow	The flow corresponding to the total capacity of a unit.
Oligotrophic	Waters with a small supply of nutrients and hence a small organic production (Gr. *oligos* small, *trophein* to nourish).
Peak Demand	The maximum rate of energy consumption that occurs within a given period of

	time. Peak demand can refer to the maximum demand placed on a system as a whole, individual parts of a system, or individual customers or applications.
Peaking	Generating capability normal designed for use only during the maximum load period of a designated time interval.
Peaking Capacity (Peaking Station)	Generating stations that are normally operated only to provide power during maximum load periods.
Power Grid	The network of conductors, their support towers, transformers, switches and other devices used to convey electrical energy from all the generating stations to the local electrical system which distributes power to the consumer.
Reach	Any length of river under study, with definable features.
Reserve Capacity	The amount by which the total system capacity exceeds the peak demand within a given time period. Some reserve is required to maintain system reliability in anticipation of unexpected high demands or equipment failures. Planning reserve is the amount by which system capacity is planned to exceed forecast annual peak demand. The absolute amount of reserve capacity is usually expressed in MW; when expressed as a percentage of expected peak demand, the term "reserve margin" usually applies.
Reservoir	Lake, sometimes artificial, where water is collected and kept in quantity for later use.
Riparian	Along the banks of rivers and streams.
Riverine	Of, pertaining to, or inhabiting rivers.
Run-of-the-River	A power plant that has no upstream storage capacity and must pass all flows as they come.
Seiche	A standing wave in a lake (perhaps from Fr. *sèche* dry, since part of the shore is laid bare by the recession of the water).
Spillway Gates (or Sluicegates)	Gates used to regulate the flow of water through an opening. They are usually used to pass water over or around dams.
Stagnation Period	The period of time in which through warming (or cooling) from above a density stratification is formed that prevents a mixing of the water mass (Lat. *stagnum* a piece of standing water).
Stop Logs	A gate which can be placed into an opening to shut off or regulate the flow of water. The gate is not permanently connected to a lifting device, and is sometimes made from squared timber, hence the term log.
Storage Capacity	The volume of water contained between the maximum and minimum allowable levels within a reservoir.
Stream Regimen	The typical annual pattern of stream flow for a particular river.

Subsistence Fishing	Engagement in fishing for the purpose of livelihood.
Tailrace	A channel carrying water away from a hydraulic generating station.
Tailwater	The water from a generating station after it has passed through the turbine.
Thalweg	Line following the deepest part of a streambed, channel or valley.
Trapline	The route, usually a narrow trail, along which a fur trapper lays his traps.
Trophic Surge	A sudden sharp increase in nutrient levels.
Turbulence	Unorganized movement in liquids and gases resulting from eddy formation (Lat. *turba* disorder).
Watershed	The area within which all water drains to collect in common channel or lake.
Young-Of-The-Year	Fish that hatched during the year under discussion or the year when caught.

8.0 LIST OF ACRONYMS

CFWIP	Community Fisheries and Wildlife Involvement Program
cms	Cubic metres per second
DFO	Department of Fisheries and Oceans
EWG	Erosion Working Group
FWIN	Fall Walleye Index Netting
GS	Generating Station(s)
LO	Licence of Occupation
MKC	Madawaska Kanu Centre
MNR	Ministry of Natural Resources
MOE	Ministry of the Environment
MTO	Ministry of Transportation
Mw	Megawatt(s)
Mwh	Megawatt hour(s)
NUGS	Non-Utility Generators
OPG	Ontario Power Generation
PAC	Public Advisory Committee
STP	Sewage Treatment Plant
Twh	Terawatt hours
WPLA	Water Power Lease Agreement(s)